

# Fingal Development Plan 2017-2023



## Strategic Flood Risk Assessment for the Fingal Development Plan 2017-2023





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# 1 INTRODUCTION

## 1.1 BACKGROUND

In accordance with Section 11 of the Planning and Development Act 2000 (as amended) Fingal County Council (FCC) completed a review of the existing County Development Plan (2011 -2017) and prepared a new County Development Plan for the period 2017–2023. In compliance with the Directive and the Planning and Development (Strategic Environmental Assessment) Regulations 2004-2011, the Planning Authority has carried out a Strategic Environmental Assessment (SEA) of the new Plan and prepared an Environmental Report of the likely significant effects on the environment of its implementation.

The Environmental Protection Agency (EPA) SEA Scoping Guidance Document outlines that the SEA should adopt policies to avoid and restrict the zoning of lands in flood prone areas. It should also adopt a policy that requires flood risk assessments to be undertaken for developments and zoning being proposed in flood prone areas. These policies should be 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’.

The Guidelines recommend that a Strategic Flood Risk Assessment (SFRA) Report be undertaken to support the SEA of proposed development plans. As recommended, FCC commissioned a SFRA to inform the policy and land use decisions in areas at risk of flooding within the County.

## 1.2 REPORT OBJECTIVES

The objective of this report is to present a SFRA for the Fingal County Development Plan 2017-2023. This report was 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 provides an assessment of all types of flood risk within the County and assisted FCC to make informed strategic land-use planning decisions and 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 warranted further investigation. Based on available data, areas at risk of flooding and flood zones in the County were identified in order to supplement the SEA and the County Development Plan.

## 1.3 DISCLAIMER & BEST AVAILABLE INFORMATION

### 1.3.1 Disclaimer

The following disclaimer should be read to avoid incorrect interpretation of the information and data provided. The SFRA has been prepared in compliance with the Guidelines 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 County Development Plan. All information in relation to flood risk is provided for general policy guidance only. All landowners and developers are instructed that Fingal 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.

Fingal County Council makes no representations, warranties or undertakings about any of the information provided in the SFRA including, without limitation, the accuracy, completeness, quality or fitness for any particular purpose of the Flood Maps or any other content. Fingal County Council makes no representations, warranties, guarantees or undertakings that the information in the Flood Maps or any other content of the SFRA is up to date. Fingal County Council does not make any warranties, representations, or undertakings about the content of any website (including any website owned or operated by or on behalf of Fingal County Council) that may be referred to or accessed by hyperlink within the SFRA.

To the fullest extent permitted by applicable law, Fingal County Council nor any of its members, officers, associates, consultants, employees, affiliates, servants, agents or other representatives shall be liable for loss or damage whether in contract, tort (including negligence), breach of statutory duty or otherwise arising out of, or in connection with, the use of, or the inability to use, the Flood Maps or any other content of the SFRA, 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 Fingal County Council have been advised of the possibility of such loss or damages, or such loss or damages were reasonably foreseeable.

Fingal County Council reserves the right to change the content and / or presentation of any of the information provided on the flood maps at its sole discretion, including these notes and disclaimer. This disclaimer and conditions of use shall be governed by, and construed in accordance with, the laws of the Republic of Ireland. If any provision of these disclaimer and conditions of use shall be unlawful, void or for any reason unenforceable, that provision shall be deemed severable and shall not affect the validity and enforceability of the remaining provisions.

### **1.3.2 Best Available Information**

The Office of Public Works (OPW), as lead agency for flood risk management in Ireland, is producing Flood Risk Management Plans (FRMPs), in line with National Flood Policy and the requirements of the EU 'Floods' Directive. Draft FRMPs are currently being produced by the OPW and its partners under the Catchment-based Flood Risk Assessment and Management (CFRAM) Programme. Datasets prepared under the CFRAM programme have been utilised in the production of the flood maps for this SFRA. These datasets are subject to change and the analysis of these datasets is only correct at the time of assessment.

The assessment is based on datasets available in February 2017 which includes datasets generated as part of the Eastern CFRAM Study, Fingal East Meath Flood Risk Assessment and Management Study (FEM FRAMS), the Preliminary Flood Risk Assessment (PFRA) and the River Tolka Flooding Study Final Report. These datasets are most comprehensive flood zone mapping available for the County and are considered appropriate for use as a strategic overview of flood risk within the County.

Please note that the guidance notes, disclaimers and conditions of use of these datasets are available online at the websites as shown below. The guidance notes, disclaimers and conditions of use for these datasets should be read carefully to avoid incorrect interpretation of the flood risk information and Flood Map data provided in the SFRA.

### CFRAM Disclaimer and Conditions of Use for Flood Maps

[maps.opw.ie/floodplans/disclaimer/](https://maps.opw.ie/floodplans/disclaimer/)

### FEM FRAM Disclaimer, Guidance Notes and Conditions of Use for Flood Maps

[fem.cfram.com/floodmaps/Map\\_Disclaimer.PDF](https://fem.cfram.com/floodmaps/Map_Disclaimer.PDF)

### PFRA Disclaimer, Guidance Notes and Conditions of Use for Flood Maps

[myplan.ie/content/Draft%20PFRA%20Maps%20-%20Users%20Notes%20and%20Conditions.pdf](https://myplan.ie/content/Draft%20PFRA%20Maps%20-%20Users%20Notes%20and%20Conditions.pdf)

### River Tolka Flooding Study Final Report

[https://www.dublincity.ie/sites/default/files/content/WaterWasteEnvironment/WasteWater/Documents/Tolka\\_Final\\_Report.pdf](https://www.dublincity.ie/sites/default/files/content/WaterWasteEnvironment/WasteWater/Documents/Tolka_Final_Report.pdf)

## **1.4 REPORT STRUCTURE**

The Fingal Study area and its 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 County Development Plan and lastly **Section 8** provides a summary.

## 2 STUDY AREA

### 2.1 INTRODUCTION

The Fingal administrative area is shown **Figure 2.1** below. The County has an extent of approximately 456 km<sup>2</sup>. The County extends east to west from the Irish Sea to the County Meath Border and north to south from the River Delvin to the River Liffey and the Dublin City municipal area. The Fingal coastline is approximately 88 km in length extending north to south from Balbriggan to Sutton. The catchments of the county are predominantly urban in the south and rural in the north. It also has active agricultural land and is one of the most productive areas for horticulture in the country. There are a number of international and national environmental designations, most of which are based along the coastal areas of the county.

The 2011 Census shows the County has a population of 273,991 and the Regional Planning Guidelines population target is 309,285 by 2022. The preliminary results for the 2016 Census published in July 2016 show that the population of Fingal has grown substantially to 296,214. This SFRA summarises the outputs for different flood risk studies which cover the county including the ongoing Eastern Catchment Flood Risk Assessment and Management Study (ECFRAM), Fingal East Meath Catchment Flood Risk Assessment and Management Study (FEM FRAM) (2011), the Preliminary Flood Risk Assessment (PFRA) (2012) and the Tolka Flooding Study (2004).



**Figure 2.1 FCC Extent and Watercourses**

## 2.2 WATERCOURSES

The principal rivers include the Delvin, Broadmeadow, Ward, Sluice, Mayne, Santry, Tolka and the Liffey. Other notable watercourses include the Turvey, Ballyboughal, Corduff and the Bracken. All watercourses in the study area flow to the Irish Sea either directly or via estuaries. **Figure 2.1** above shows the watercourses and principal rivers in the County. All of the watercourses lie within Hydrometric Area (HA) 08 (Nanny-Delvin) and HA 09 (Liffey-Dublin Bay). The catchments of the County are a mix of rural (north of county) and urban. There are large urban areas located on some of the principal rivers including Swords (Broadmeadow and Ward), Blanchardstown and Mulhuddart (Tolka).

## 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 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.

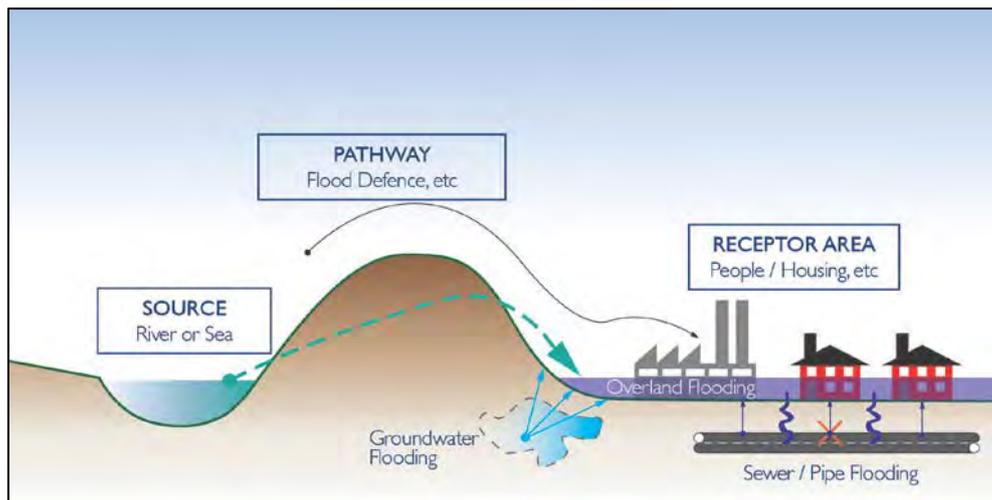
The Guidelines recommend that Flood Risk Assessments (FRA) be carried out to identify the risk of flooding to land, property and people. FRAs should be carried out at different scales by government organisations, local authorities and for proposed developments appropriate to the level of information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

- **Regional Flood Risk Appraisal (RFRA)** – a broad overview of flood risk issues across a region to influence spatial allocations for growth in housing and employment as well as to identify where flood risk management measures may be required at a regional level to support the proposed growth. Currently being undertaken by the OPW through the CFRAMs process.
- **Strategic Flood Risk Assessment (SFRA)** – an assessment of all types of flood risk informing land use planning decisions. This will enable the Planning Authority to allocate appropriate sites for development, whilst identifying opportunities for reducing flood risk. The SFRA will revisit and develop the flood risk identification undertaken in the RFRA, and give consideration to a range of potential sources of flooding. An initial flood risk assessment, based on the identification of Flood Zones, will also be carried out for those areas, which will be zoned for development. Where the initial flood risk assessment highlights the potential for a significant level of flood risk, or there is conflict with the proposed vulnerability of development, then a site specific FRA will be recommended, which will necessitate a detailed flood risk assessment.
- **Site Specific Flood Risk Assessment (FRA)** – site or project specific flood risk assessment to consider all types of flood risk associated with the site and propose appropriate site management and mitigation measures to reduce flood risk to and from.

## 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**

FRAs 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 which is caused by high sea levels resulting in the sea

overflowing onto the land. High sea levels can be caused by high tides, storm surges and wave action acting independently or in combination.

- 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.
- Coastal flooding which is caused by high sea levels resulting in the sea overflowing onto the land.

### 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
0.5	200
0.1	1000

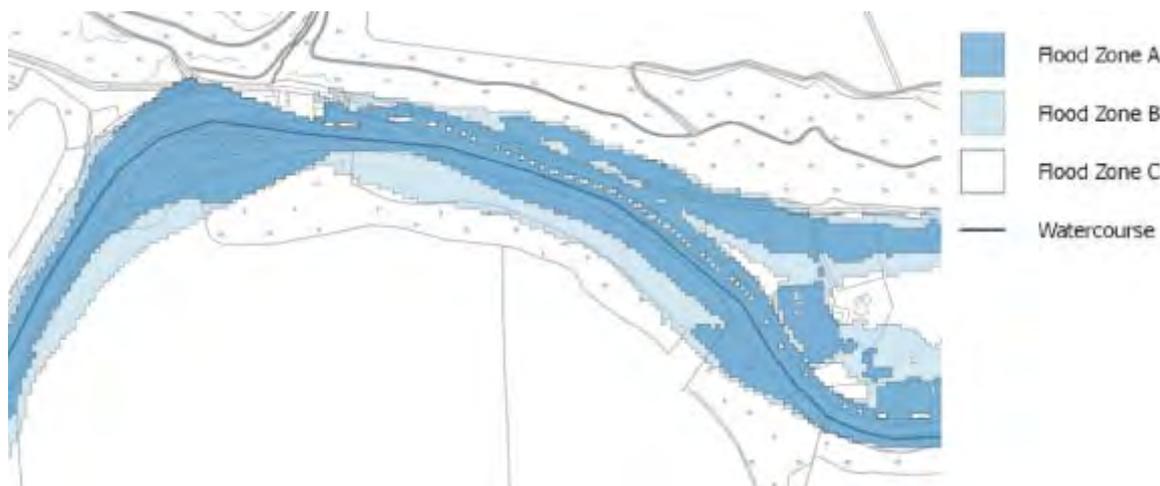
The consequences of flooding depend on the hazards associated with the flooding (e.g. depth of water, speed of flow, rate of onset, duration, wave action effects, water quality), and the vulnerability of people, property and the environment potentially affected by a flood (e.g. the age profile of the 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 still carry a residual risk of flooding from overtopping, failure of the defences and deterioration due to lack of maintenance. **Figure 3.2** shows a typical flood zone map.



**Figure 3.2 Typical Flood Zone Map**

### 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.

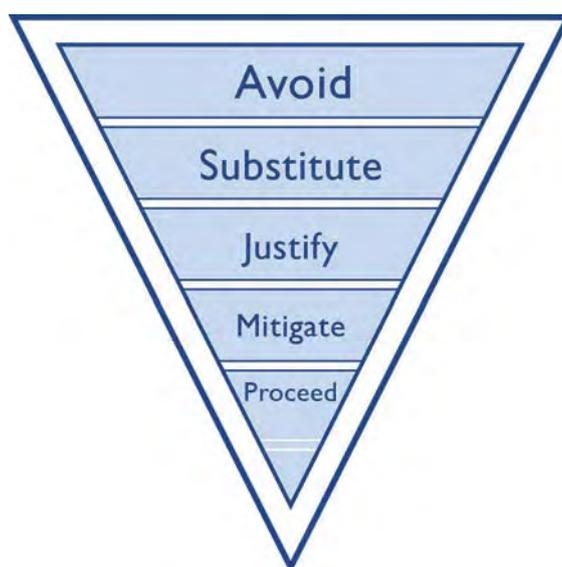
### 3.5 STRATEGIC FLOOD RISK ASSESSMENT

The purpose of this report is to carry out a SFRA at county scale for Fingal but also to assess particular areas of interest at town scale. The Guidelines recommend a series of outputs for a SFRA. These outputs in broad 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 an 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 3.3** 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 3.3 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 Development Plan 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)	<p>Garda, ambulance and fire stations and command centres required to be operational during flooding;</p> <p>Hospitals;</p> <p>Emergency access and egress points;</p> <p>Schools;</p> <p>Dwelling houses, student halls of residence and hostels;</p> <p>Residential institutions such as residential care homes, children's homes and social services homes;</p> <p>Caravans and mobile home parks;</p> <p>Dwelling houses designed, constructed or adapted for the elderly or, other people with impaired mobility; and</p> <p>Essential infrastructure, such as primary transport and utilities distribution, including electricity generating power stations and sub-stations, water and sewage treatment, and potential significant sources of pollution (SEVESO sites, IPPC sites, etc.) in the event of flooding.</p>
Less vulnerable development	<p>Buildings used for: retail, leisure, warehousing, commercial, industrial and non-residential institutions;</p> <p>Land and buildings used for holiday or short-let caravans and camping, subject to specific warning and evacuation plans;</p> <p>Land and buildings used for agriculture and forestry</p> <p>Waste treatment (except landfill and hazardous waste);</p> <p>Mineral working and processing; and</p> <p>Local transport infrastructure.</p>
Water-compatible development	<p>Flood control infrastructure;</p> <p>Docks, marinas and wharves;</p> <p>Navigation facilities;</p> <p>Ship building, repairing and dismantling, dockside fish processing and refrigeration and compatible activities requiring a waterside location;</p> <p>Water-based recreation and tourism (excluding sleeping accommodation);</p> <p>Lifeguard and coastguard stations;</p> <p>Amenity open space, outdoor sports and recreation and essential facilities such as changing rooms; and</p> <p>Essential ancillary sleeping or residential accommodation for staff required by uses in this category (subject to a specific warning and evacuation plan).</p>
*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, as set out in **Table 3.2**, and where avoidance or substitution is not appropriate. Where land use zoning objectives are being retained, they must satisfy all of the following criteria as per **Table 3.4**.

**Table 3.4 Justification Test for Development Plans**

<b>Justification Test for Development Plans</b>	
1.	The urban settlement is targeted for growth under the National Spatial Strategy, regional planning guidelines, statutory plans as defined above or under the Planning Guidelines or Planning Directives provisions of the Planning and Development Act, 2000, as amended.
2.	The zoning or designation of the lands for the particular use or development type is required to achieve the proper planning and sustainable development of the urban settlement and, in particular: <ol style="list-style-type: none"> <li>i. Is essential to facilitate regeneration and/or expansion of the centre of the urban settlement;</li> <li>ii. Comprises significant previously developed and/or under-utilised lands;</li> <li>iii. Is within or adjoining the core of an established or designated urban settlement;</li> <li>iv. Will be essential in achieving compact and sustainable urban growth; and</li> <li>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.</li> </ol>
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 recommend 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;
- Prepare a local area plan informed by a detailed flood risk assessment to address zoning and development issues in more detail and prior to any development; and/or
- 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.

Records of Development Plan Justification Tests are shown in Appendix B.

## 4 DEVELOPMENT MANAGEMENT AND FLOOD RISK

### 4.1 OVERVIEW

All development in flood risk areas 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 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.

**Table 4.1 Justification Test for Development Management**

<b>Justification Test for Development Management</b>	
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.	The proposal has been subject to an appropriate flood risk assessment that demonstrates: <ol style="list-style-type: none"> <li>i. The development proposed will not increase flood risk elsewhere and, if practicable, will reduce overall flood risk;</li> <li>ii. The development proposal includes measures to minimise flood risk to people, property, the economy and the environment as far as reasonably possible;</li> <li>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</li> <li>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.</li> </ol>
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.	

### 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 Fingal. 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 10 - 15 meters wide riparian buffer strip each side of the watercourse is required. In dense urban areas the width of the riparian buffer strip is to be agreed with FCC.
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.

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 which are acceptable include devices such as: Swales, Permeable Pavements, Filter Drains, Storage Ponds, Constructed Wetlands, Soakaways, etc.
6. An adequate area should be included for attenuation in addition to open space.
7. 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.
8. For gravity systems a Hydrobrake (or similar approved flow control device) shall be installed

## 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 such 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 GSDSDS 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 e.g. affect existing watercourses, floodplains or flood relief works. These proposals should follow best practice in the management of health and safety for users and residents of the proposal.

### 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 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 level plus suitable freeboard. (Recommended levels of freeboard include 500 mm for fluvial flood levels and 750mm for coastal flood levels)
- For planning purposes it is recommended that all sites be considered as undefended as per “the Guidelines”.

- 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 level plus suitable freeboard. (Recommended levels of freeboard include 500 mm for fluvial flood levels and 750mm for coastal 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 with the Planning Guidelines then the application should be refused on flood risk grounds and a new application submitted, allowing for appropriate design and a FRA.

## 5 FLOOD RISK

### 5.1 INTRODUCTION

There are several sources of relevant flood risk information available for Fingal. This information was used to generate the fluvial flood zone maps as shown in Appendix A. **Figure 5.1** below shows an overview of the flood zones and historical flooding spots.

### 5.2 HISTORICAL FLOODING

A review of historical flood data was carried out for the relevant catchment flood studies (See Section 5.3 below for more information on the Catchment Flood Studies) using information provided on floodmaps.ie and in consultation with FCC. The main sources of flooding in the county are fluvial, pluvial and coastal flooding.

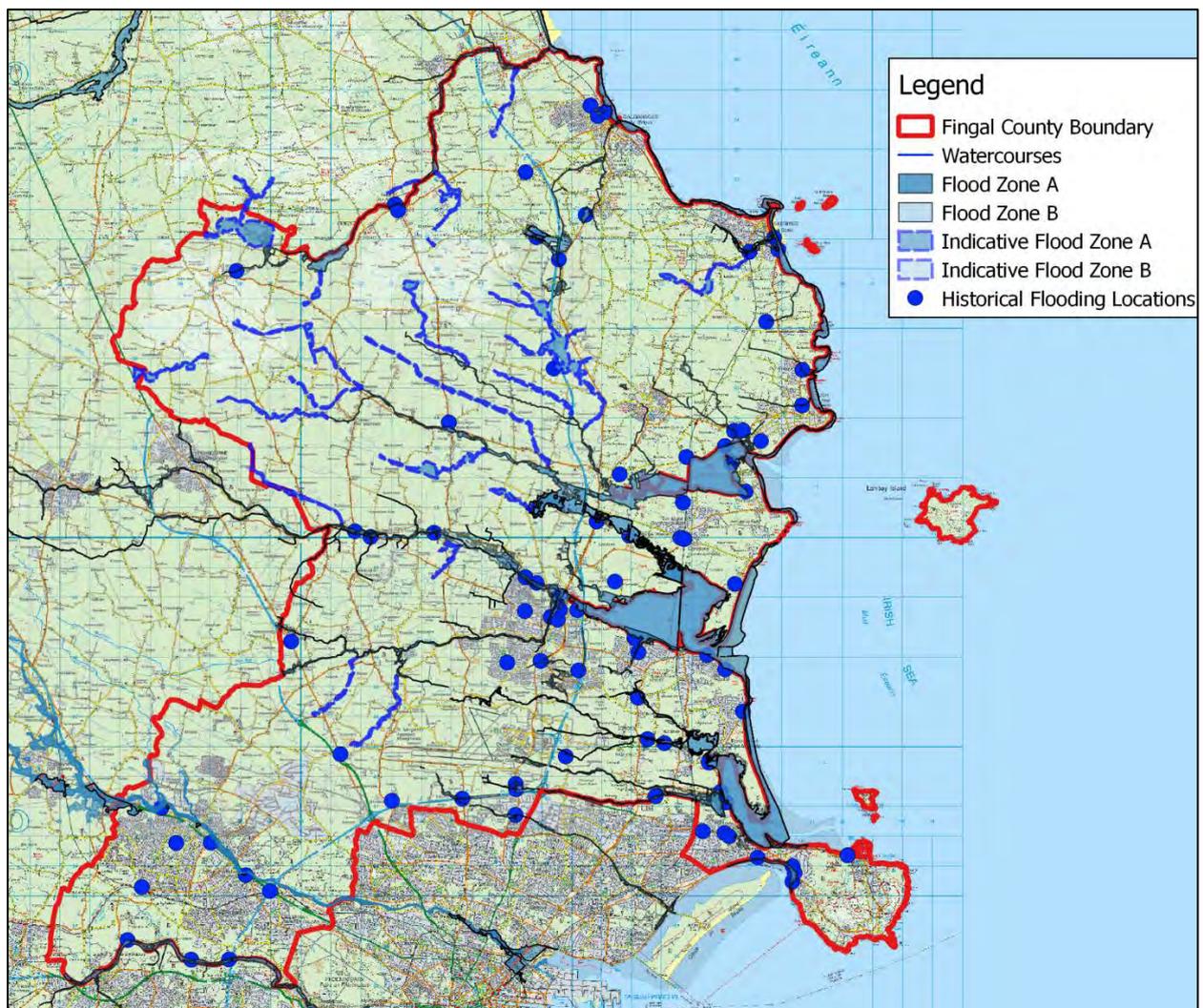


Figure 5.1 Flood Risk Overview for Fingal

## 5.3 FLOOD STUDIES

Fingal has been subject to two previous catchment flood studies: the River Tolka Flooding Study (2004) and the Fingal East Meath Flood Risk Assessment and Management Study (FEM FRAMS) (2011). The outputs of the two studies include flood zone mapping, flood risk management proposals and flood risk management plans, which can be integrated into the Fingal County Development Plan. Fingal is also subject to the ongoing Eastern Catchment Flood Risk Assessment and Management (ECFRAM) Study. Fingal has also been subject to two coastal flooding studies: the Irish Coastal Protection Strategy Study (ICPSS) and the Dublin Coastal Flooding Protection Project.

### 5.3.1 River Tolka Flooding Study

As an extension of the Greater Dublin Strategic Drainage study, the River Tolka Flooding Study was commissioned by Dublin City Council, in association with Fingal County Council, Meath County Council and the Office of Public Works in 2002. The study arose from concerns regarding increased flooding risk to properties along the River Tolka following a significant flood in November 2000, when many properties were inundated particularly in parts of Meath and the Dublin City Council area.

A report was produced that defined the history of flooding in the River Tolka. In order to quantify flood risk, this utilised the relevant historic data available to develop a profile of flood risk for the catchment and summarised the outcome of modelling studies related to previous flood data. It summarised options available for flood alleviation in the catchment and identified an integrated series of measures. These were recommended for implementation in order to manage flood risk, based on technical, environmental and economic assessment.

Within the 2004 Tolka Flooding Study, Flood Zone A was identified and extents mapped. However, Flood Zones B and C had not been identified. In 2010 additional modelling was carried to map the Flood Zone B for the River. The floodplain mapping project assessed the 0.1% AEP floodplain extents by hydraulic modelling using the proposed defences as modelled in the original Tolka Flooding Study, i.e. not using “as-constructed” information.

The 2004 and 2010 flood zone mapping for the Tolka area pre-date some major infrastructural changes in the M3 area. Therefore the OPW are currently reviewing options for updating the flood zone mapping for the River Tolka mapping. It is anticipated that this work will be carried out in 2017. Therefore the best available information currently is the 2004 Flood Zone A and 2010 Flood Zone B mapping which will be used for the County Development Plan until the completion of the OPW Tolka Review. Following the review, the FCC SFRA will be updated to reflect the more up to date information.

### 5.3.2 National Catchment Flood Risk Assessment and Management Studies

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 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). The Fingal administrative area falls within two CFRAMs, The ECFRAM and the FEM FRAM.

### **5.3.2.1 Fingal East Meath Catchment Flood Risk Assessment and Management Study**

The FEM FRAM was a pilot study for the National FRAM programme and was initiated in 2008 and completed in 2011. It assessed flood risk for the vast majority of County Fingal and identified the flood zones appropriate for compliance with the OPW planning guidelines. It assessed the flood risk associated with fluvial, pluvial, groundwater and coastal flooding. It also identified a series of structural and non-structural options for managing high risk areas in Fingal. The FEM FRAM also prepared a strategic flood risk management plan for the Fingal East Meath area namely, the Fingal East Meath Flood Risk Management Plan (FEM FRMP) an associated Strategic Environmental Assessment (SEA). This plan sets out the measures and policies that should be pursued by the Local Authorities and the OPW to achieve the most cost-effective and sustainable management of flood risk within the Fingal and East Meath study area.

The OPW have undertaken some updates to the FEM FRAM flood maps to account for changes to flood zones since the completion of the FEM FRAM study. These include updates to flood zone mapping along the Gaybrook Stream and the Rolestown Stream to account for flood defence works constructed and updates to mapping along the Cuckoo Stream to account for corrected flows. The flood zone mapping for these updated areas have been included in the SFRA mapping.

Also the OPW are currently reviewing options for updating the flood zone mapping for Streamstown in Malahide and Skerries. It is anticipated that this work will be carried out in 2017. Therefore the FEM FRAM mapping represents the best information currently available and will be used for the County Development Plan, until the completion of the reviews for Streamstown and Skerries. Following the review, the FCC SFRA will be updated to reflect the more up to date information.

The OPW also undertook a review of flood extents along the Ballyboghil River and found there were no changes to the flood mapping for Ballyboghil and Turvey Rivers. Embankments in the area were already accurately represented in the original model.

### **5.3.2.2 Eastern Catchment Flood Risk Assessment and Management Study**

The ECFRAM study is currently ongoing and investigating flood risk in areas outside the scope of the FEM FRAM study and the Tolka Flooding Study. These include areas adjacent to the Liffey River, the Santry River and coastal flooding in Sutton and Baldoyle. The flood zone mapping for these areas have been included in the SFRA mapping. If it is deemed necessary, flood risk management objectives, options and plans will be developed for these areas in Fingal. To ensure continuity and all-inclusiveness the River Tolka Flooding Study and the FEMFRAM Study are being incorporated into the final Eastern CFRAM FRMP. The FRMP of the FEM FRAM and the Tolka Flooding Study will be reviewed on a six-yearly cycle as part of the ECFRAM Study when it is complete. Each AFA will be reviewed as part of this process. The review will include but not limited to:

- Monitoring of compliance with the planning guidance in relation to flood risk, including use of the flood maps in spatial planning and development management;

- Monitoring of land use change and management to establish if it is significant in terms of flood risk and needs to be taken account of in the FRMP;
- Monitoring institutional capacity, both technical and quantity, in relation to the FRMP programme and standards, and initiate strengthening as necessary; and
- Review and monitoring will be an on-going exercise and lessons learnt will be taken account of in the national CFRAMS/FRMP programme. Lessons learnt will be acted on once they are confirmed and not held back until a six-yearly review.

### 5.3.3 AFAs

The three catchment flood studies have identified areas for further assessment (AFAs), as shown in **Table 5.1**. These areas will be or have been assessed by a flood risk management plan through the National CFRAM Programme.

**Table 5.1 Fingal AFAs**

AFA	FRAM Study
Balbriggan	FEM
Balgriffin	FEM
Belcamp Park	FEM
Clonee	Tolka
Donabate	FEM
Kinsealy	FEM
Lucan to Chapelizod	East
Lusk	FEM
Malahide/Portmarnock	FEM
Mulhuddart	Tolka
Oldtown	FEM
Portrane	FEM
Rush	FEM
Santry	East
Skerries	FEM
Staffordstown	FEM
Sutton & Baldoyle	East
Sutton & Howth North	East
Swords	FEM
Swords (South)	FEM

### 5.3.4 Flood Risk Management Plans

The draft Eastern CFRAM FRMP was published in August 2016 and outlined a series of proposed flood risk policy measures for the local authorities, but also specific measures for the Fingal AFAs. The proposals 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](http://www.opw.ie/floodplans). To ensure a county wide approach the FEM FRAM Study and River Tolka Flooding flood risk management proposals that have not been progressed since their completion have been adopted into the Eastern CFRAM FRMP.

**Table 5.2 South Eastern CFRAM Draft FRMP proposed flood risk management measures**

CFRAM Code	Measure (Including measures from hydrometric areas 08 & 09)
<b>Regional Measures</b>	
IE09-UoM-9011-M22 / IE08-UoM-9011-M22	Application of the Guidelines on the Planning System and Flood Risk Management (DECLG/OPW, 2009)
IE09-UoM-9012-M34 / IE08-UoM-9012-M34	Implementation of Sustainable Urban Drainage Systems (SUDS)
IE09-UoM-9013-M24 / IE08-UoM-9013-M24	Consideration of Flood Risk in local adaptation planning.
IE09-UoM-9023-M33 / IE08-UoM-9023-M33	Ongoing Maintenance of Drainage Districts
IE09-UoM-9031-M41 / IE08-UoM-9031-M41	Establishment of a National Flood Forecasting and Warning Service
IE09-UoM-9032-M42 / IE08-UoM-9032-M42	Ongoing Appraisal of Flood Event Emergency Response Plans and Management Activities
IE09-UoM-9033-M51 / IE08-UoM-9033-M51	Individual Action to Build Resilience
IE09-UoM-9041-M61 / IE08-UoM-9041-M61	Flood-Related Data Collection
IE09-UoM-9051-M61 / IE08-UoM-9051-M61	Minor Works Scheme
<b>Lucan to Chapelizod AFA</b>	
IE09-090090-0709-M33	Lucan to Chapelizod Flood Relief Scheme: Option 1 Hard defences: - Progression of the Lucan to Chapelizod 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.
<b>Santry AFA</b>	
IE09-090099-1209-M61	Santry Flood Relief Scheme: Option 4 - Hard defences and Improvement of Channel Conveyance - Progression of the Santry Flood Relief Scheme, comprising replacing four culverts at Santry Demesne pond and hard defences (flood walls and embankments) to project-level development and assessment for refinement and preparation for planning / Exhibition and, as appropriate, implementation.
<b>Sutton &amp; Howth North AFA</b>	
IE09-090103-1309-M33	Sutton & Howth North Flood Relief Scheme: Option 1 - Hard defences - Progression of the Sutton & Howth North Flood Relief Scheme, comprising hard defences (wave return wall and flood defence walls) to project-level development and assessment for refinement and preparation for planning / Exhibition and, as appropriate, implementation.
<b>Malahide &amp; Portmarnock, Strand Road AFA</b>	
IE09-090091-1409-M33	Malahide & Portmarnock, Strand Road AFA, Flood Relief Scheme: Option 1 – Demountable hard defences and embankments - Progression of the Malahide & Portmarnock, Strand Road, Flood Relief Scheme, comprising hard defences (flood embankments) and improvement of channel conveyance, to project-level development and assessment for refinement and preparation for planning / Exhibition and, as appropriate, implementation.
<b>St. Margaret's, Belcamp and Balgriffen AFA</b>	
IE09-090072-1509-M61	St Margaret's, Dublin Airport, Belcamp and Balgriffen Flood Relief Scheme: Option 2 - Hard defences and Improvement of Channel Conveyance - Progression of the St Margaret's, Dublin Airport, Belcamp and Balgriffen Flood Relief Scheme, comprising hard defences (flood embankments) and improvement of channel

CFRAM Code	Measure (Including measures from hydrometric areas 08 & 09)
	conveyance, to project level development and assessment for refinement and preparation for planning / Exhibition and, as appropriate, implementation.
<b>Dublin City AFA - Tolka Measures</b>	
IE09-090082-2709-M61	Maintenance of the Tolka Flood Alleviation Scheme - Continue to undertake maintenance of the Tolka Flood Alleviation Scheme
IE09-090082-2809-M61	Progression of the remaining elements of the Tolka Flood Alleviation Scheme - Progress the remaining elements of the Tolka Flood Alleviation Scheme through project level development and assessment for refinement and preparation for planning/Exhibition and, as appropriate, implementation. In the Fingal area this work comprises of the construction/upgrade of a culvert on the Pinkeen Stream at Damastown Rd (Item 21 in the Tolka Study Report)
<b>Broadmeadow and Ward Scheme Measures</b>	
IE08-080064-0408-M61	Maintenance of the Broadmeadow and Ward Scheme - Continue to undertake maintenance of the Broadmeadow and Ward Scheme in line with legislative requirements.
<b>Matt Scheme Measures</b>	
IE08-080053-0508-M25	Maintenance of the Matt Scheme - Continue to undertake maintenance of the Matt Scheme in line with legislative requirements.
<b>Rush AFA Measures</b>	
IE08-080061-0808-M33	Rush Flood Relief Scheme: Option 1a - Improvement of Channel Conveyance and Hard defences - Progression of the Rush Flood Relief Scheme, comprising hard defences (flood walls and embankments) and improvement of channel conveyance to project-level development and assessment for refinement and preparation for planning / Exhibition and, as appropriate, implementation.
<b>Skerries AFA Measures</b>	
IE08-080062-0908-M61	Skerries Flood Relief Scheme: Option 2 - Improvement of Channel Conveyance - Progression of the Skerries Flood Relief Scheme, comprising hard defences (flood walls and embankments), culvert removal and upgrade of three access bridges to project-level development and assessment for refinement and preparation for planning / Exhibition and, as appropriate, implementation.
<b>IRR Measures</b>	
IE08-UoM-0608-M61	Progression of FEM FRAM IRR Flood Relief Scheme - Progress the FEM FRAM IRR Flood Relief Scheme through detailed design in preparation for implementation and subsequent maintenance

### 5.3.5 Coastal flooding studies

Fingal has been subject to two coastal flooding studies: The Irish Coastal Protection Strategy Study (ICPSS) – Phase 3 – North East Coast, and the Dublin Coastal Flooding Protection Project (DCFPP). The ICPSS used numerical modelling of combined storm surges and tide levels to obtain extreme water levels along the coastline. These levels were used to generate indicative coastal flooding maps for the 0.5% and 0.1% AEP events. The DCFPP Report included information on existing defence assets, tide levels, drawings showing the extent of the February 2002 tidal flood event, predictive flood hazard maps for the 0.5% AEP tidal event and proposed flood protection works. These two reports were reviewed as part of the FEM FRAM and their outputs have largely been superseded by the FEM FRAM flood maps. Further coastal flooding modelling was undertaken as part of the Eastern CFRAM Study examining areas in Sutton and Howth.

## 5.4 FLOOD DEFENCE SCHEMES

To counteract the known flood risk in the County, river/stream improvement works have been carried out in the last 20 years. These include recommendations from the FEM FRAM and Tolka Flooding Study FRMPs:

- FEM FRAM
  - Aspen Drive - Improved channel conveyance by widening and deepening of the Gaybrook Stream to reduce fluvial flood risk to properties at Aspen near Kinsealy
  - Rolestown - Construction of flood defence embankments along left bank of Broadmeadow River tributaries upstream of R125
  - As noted in section 5.3.2.1 the flood zone maps have been updated to account for these defences
- Tolka River Flooding Study
  - Channel regrading and embankment works adjacent to the N3
  - Embankment adjacent to the Westpoint Business Park
  - Replacement and upgrade of the Mulhuddart Bridge
  - Floodwalls and embankments adjacent to properties near the Mulhuddart Bridge
  - Embankment adjacent to properties on Herbert Road
  - As noted in section 5.3.1 the OPW are undertaking a review of the flood zone mapping along the Tolka to account for the defences

Additional flood relief works outside of the recommendations of the FRMPs were carried out in Grange, south of Malahide. An offline flood detention pond was constructed to attenuate up to 4,000m<sup>3</sup> of water and caters for the 0.1% AEP Event.

Any planning decisions should also be cognisant of potential future works within the county. These include recommendations from the FEM FRAM FRMP and other Flood Studies including the Howth Flooding Study Preliminary Review and the Preliminary Flood Risk Assessment of Portrane.

- Additional potential works identified by the FEM FRAM Study include:
  - Balgriffin - Improving channel conveyance by removing old bridge structure combined with construction of flood defence embankments and walls upstream of R123 and along left bank of Mayne River.
  - Portmarnock - Rehabilitating and raising existing coastal defences at Strand Road (including rehabilitation of flapped outfall) and construction of flood defence embankment.
  - Malahide - Construction of demountable flood defences at underpass along with embankments to protect at risk properties in Malahide town centre.
  - Rush - Improve conveyance by constructing secondary culvert along Channel Road to protect properties at risk from fluvial flooding along the West Rush stream.
  - Skerries –Improve channel conveyance by replacing culverts under roads and railway with larger capacity culverts, and widening channel through park to reduce fluvial flood risk to properties at Miller Lane and Sherlock Park.

- Howth Flooding Study Preliminary Review –Identified options to alleviate flooding along the Howth Road and Old Castle Avenue. The report concluded that the preferred options should progressed to detailed design and would include:
  - Howth Road - Construction of approximately 300m of 600mm diameter sewer from the Howth Road connecting to the Bloody Stream Surface Water Sewer
  - Old Castle Avenue - Re-grading an existing ditch adjacent, construction of a 15m wall, removing the a trash screen and upgrading a 450mm pipe to 600mm.
  - FCC are currently undertaking a detailed assessment of the flooding in Howth to develop flood relief options for the area.
- Preliminary Flood Risk Assessment Portrane - Agreed with the FEM FRAM study that there is a current risk to residential properties at northern end of the Burrow and on the west side of the Burrow along the estuary from tidal flooding. Under climate change scenarios more properties are at risk from tidal flooding due to sea level rise and continuing coastal erosion which could allow tidal flooding to progress further inland. Potentially affected areas include the edge of estuary on Marsh road and the Burrow road and at the northern end of the Burrow. The central region of the Burrow becoming flooded is dependent on future rates of coastal erosion. The study recommended that a more detailed assessment be carried out to identify areas where coastal defences could be constructed to prevent tidal flooding and prevent further erosion.
- Surface Water Systems will be also be designed and constructed for Donabate and Garristown.

#### **5.4.1 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.

The Flood Zones along the Tolka ignore the effect of the defences and defended areas have been delineated. Any planning applications within these areas have a residual risk associated with them and an appropriately detailed FRA should be included with any applications to define mitigation measures and finished floor levels. As noted in section 5.3.1 the OPW are undertaking a review of the flood zone mapping along the Tolka to account for the defences.

Following recommendations from the FEM FRAM FRMP, defences have been put in place at Aspen Drive and Rolestown. Their effect on the flood extent for the surrounding area has been re-modelled as part of the Eastern CFRAM (as discussed in section 5.3.2.1). Any planning applications within these areas will have a residual risk associated with them and an appropriately detailed FRA should be included with any applications to define mitigation measures and finished flood levels.

### **5.5 OPW PRELIMINARY FLOOD RISK ASSESSMENT INDICATIVE FLUVIAL FLOOD MAPS**

The Preliminary Flood Risk Assessment (PFRA) is a national screening exercise completed by the OPW in 2012 based on available and readily-derivable information. The PFRA aimed to identify areas where there may be a significant risk associated with flooding. Indicative fluvial flood maps were produced to help identify these areas. The mapping did not account for flood defences, channel structures or channel works. Areas where the risks associated with flooding might be significant

were identified and are referred to as Areas for Further Assessment, or 'AFAs'. More detailed assessment of the AFA's is being undertaken through the CFRAM Studies to more accurately assess the extent and degree of flood risk, and, where the risk is significant, to develop where possible measures to manage and reduce the risk.

The PFRA mapping has been used to define the flood zones in places outside of the scope of the FEM FRAM Study, CFRAM Study and Tolka Flooding Study. These areas should be treated with caution due to the indicative nature of the PFRA mapping. The PFRA flood zone mapping is largely confined to rural areas in the north of the county. The PFRA flood zone mapping is provided for information purposes to help identify areas where flood risk should be explored in greater detail. The PFRA mapping should not be solely used to define flood zones for an area as it is not considered suitable as a Stage 2 assessment. One previously zoned area in Ballymadun has identified potential flood risk using the PFRA mapping adjacent to the Hurley River see section 6.12 for further detail.

## 5.6 SFRA FLOOD ZONE MAPPING SUMMARY

The flood zones are largely derived from the FEM FRAM Study, the Tolka Flooding Study and Eastern CFRAM Study mapping. These maps are the most comprehensive flood maps produced for Fingal since the introduction of the Guidelines and the Floods Directive. Flood extents for areas that are outside of the scope of the three flood studies are supplemented by fluvial mapping from the earlier OPW Preliminary Flood Risk Assessment (PFRA) Report. The flood zones only account for inland flooding and coastal flooding. **Table 5.2** highlights the adequacy and confidence of the information used in the Flood Zone mapping.

As a conservative approach, due to some discrepancies between datasets received for The Tolka Flooding Study, the Flood Zone A has been interpreted as the worst case scenario from two datasets generated as part of the Tolka Flooding Study. The intertidal zone, where fluvial and coastal flooding interact, has been incorporated in the three flood studies mapping using joint probability analysis. Hence any impact coastal influences may have upstream along the watercourses are accounted for in the mapping. The ICPSS and the DCFPP coastal flooding outlines have largely been superseded by the FEM FRAM and CFRAM mapping hence those studies' coastal flooding maps have been adopted for the SFRA.

The flood zone maps are shown in Appendix A. Flood Zone Mapping Disclaimers, guidance notes and conditions of use for the maps can be found at the [FEM FRAM Study](#), [Tolka Flooding Study](#) and [CFRAM](#) project websites. It should be noted that Fingal County Council make no representations, warranties or undertakings about any of the information in these maps including, without limitation, their accuracy, their completeness or their quality or fitness for any particular purpose.

The flood zone mapping has been used to enable FCC 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 OPW have had some updates to the FEM FRAM flood maps undertaken to account for changes to flood zones since the completion of the FEM FRAM study. These include updates to flood zone mapping along the Gaybrook Stream and the Rolestown Stream to account for flood defence works and also updates to mapping along the Cuckoo Stream to account for corrected flows.

Also the OPW are currently reviewing options for updating the flood zone mapping for Streamstown (Malahide), along the River Tolka and in Skerries. It is anticipated that this work will be carried out in

2017. Therefore the best available information currently is the FEM FRAM and Tolka Flood Studies mapping which will be used for the County Development Plan until the completion of the reviews for Streamstown, the Tolka River and Skerries. Following the review, the FCC SFRA will be updated to reflect the more up to date information.

**Table 5.3 Adequacy of information for flood zone mapping**

Flood Zone Mapping Source	Confidence	Comments
Eastern CFRAM	High / Moderate	More recent updates to flood defences, channel structures or channel works may not be accounted for.
FEM FRAM	High / Moderate	More recent updates to flood defences, channel structures or channel works may not be accounted for.  Future updates to areas in Streamstown, Malahide and Skerries will be incorporated into the SFRA following their completion.
Tolka Flooding Study	High / Moderate	More recent updates to localised flood defences, channel structures or channel works may not be accounted for.  Future updates to the Tolka River will be incorporated into the SFRA following its completion.  Due to some discrepancies between datasets received for The Tolka Flooding Study, for conservative purposes the Flood Zone A has been interpreted as the worst case scenario from two datasets representing generated as part of the Tolka Flooding Study
OPW PFRA	Low / Very Low	These are indicative flood zone maps and should be used with caution. They do not account for flood defences, channel structures or channel works. They have been used to infill flood zones in areas outside of the scope of the other flood studies.

## 5.7 OTHER SOURCES OF FLOODING

### 5.7.1 Overview

The flood zones only account for fluvial and coastal 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

A groundwater flood hazard assessment was undertaken as part of the FEM FRAM. A desk study reviewed all the available data on groundwater to produce an assessment of the groundwater flood risk in the FEM FRAM study area to investigate the necessity of groundwater monitoring in the study area and possibly recommend groundwater monitoring locations if required. The study also investigated the mechanisms by which groundwater flooding can occur in the area and their possible remedial measures. The hydro-geological conditions in the FEM FRAM study area together with all other available information indicated that the conditions do not exist for groundwater flooding;

therefore groundwater flooding is not a significant risk within the FEM FRAM study area. There is however a risk of groundwater flooding to basements or deep excavations.

For developments such as this, the study recommends the drilling of a borehole and the installation of a piezometer to establish the depth of the groundwater table in relation to the base of the excavation. If the water table is within 1 meter of the base then the development needs to be conditioned to ensure that the basement is adequately sealed / tanked. All basements must be properly designed in accordance with British Standard BS8102:2009.

Similarly the OPW 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 Fingal County but should still be examined at detailed FRA level particularly if the development includes proposals for basements.

### 5.7.3 Pluvial Flooding

A pluvial hydraulic assessment was undertaken for the AFAs in the FEM FRAM study for specific design events and future scenarios. The objective of the pluvial flood hazard was to assess the potential locations where pluvial floodwaters and run-off might accumulate within APSR's during extreme rainfall events and/or blockage or saturation of the stormwater drainage systems. The pluvial flood hazard also assessed the degree of flooding that could potentially occur. The result of pluvial model analysis was then presented in 1:50,000 maps for review purpose. The results indicated that only a few of the APSRs were at risk of flooding from pluvial sources only.

For the SFRA the results of the FEM FRAM pluvial assessment were reviewed against historical records and the OPW Pluvial Flooding Risk Assessment (PFRA) stud. The OPW PFRA study provides a national level pluvial screening of areas that are at potential risk of pluvial flooding. **Table 5.3** outlines areas where the historical, PFRA and FEM FRAM datasets agreed for areas that are at risk from indicative pluvial flooding. Development in these areas should be cognisant of pluvial risk.

**Table 5.4 Areas at risk from indicative pluvial flooding**

Location	Brief description of potential Pluvial Flood Risk
Balbriggan	FEM FRAM shows flooding at Balrothery. Also identified as an area prone to historical flooding and indicative of a 1% AEP risk on the PFRA mapping
Rowans Little Area	FEM FRAM shows pluvial flooding either side of the M1. Also identified as an area indicative of a 1% AEP risk on the PFRA mapping
Naul area	FEM FRAM shows localised pluvial flooding near the square in Naul village. Also identified as an area indicative of a 1% AEP risk on the PFRA mapping
Skerries Area	FEM FRAM shows significant flooding adjacent to the Mill Stream where it flows along the railway line. The model also shows flooding in the urban area located to the east of R127 and west of R128 and also along the coast line. Several areas also indicative of a 1% AEP risk on the PFRA mapping
Rush Area	FEM FRAM shows flooding along the St. Catherine's, Rushtown, Rush West, Jones and Brides streams, Rush Demesne, Whitestown Road, Crescent South Shore Road, Spout Road and Rathartan Road. The Whitestown Road area is also prone to historic pluvial flooding. Several of the areas are indicative of a 1% AEP risk on the PFRA mapping
Lusk Area	FEM FRAM shows flooding mostly along the Bride and Baleally streams in the Lusk area. Scattered flooding was also observed throughout Lusk area, but significant flooding was observed at Racecourse Common and Church and Round Tower area. Theses area also indicative of a 1% AEP risk on the PFRA mapping.
Ballyboghil	FEM FRAM shows significant flooding at the R129 and R108 crossing; along the R129 where the Ballyboghil river flows adjacent to this road and around Doorage,

Location	Brief description of potential Pluvial Flood Risk
	Belinstown and Drishoge area. This area has been identified as an area prone to historic pluvial flooding and is indicative of a 1% AEP risk on the PFRA mapping
Oldtown	FEM FRAM shows some scattered flooding at Oldtown urban area, however significant flooding was observed adjacent to the Ballyboghil River where it flows along the small road joining the R129 and the R122. This area also indicative of a 1% AEP risk on the PFRA mapping
Donabate Area	FEM FRAM shows extensive flooding at Ballisk Common, at Hearst Road and Ballisk Lane. These area also identified as an area prone to historic flooding and show an indicative 1% AEP risk on the PFRA mapping
Turvey Bridge area to the west of Donabate	FEM FRAM shows extensive flooding to the west of Newbridge Demesne. Area prone to historic flooding and shows a 1% AEP risk on the PFRA mapping
Swords Area	FEM FRAM shows extensive flooding on both sides of the Broadmeadow and Ward rivers. The locations of extensive flooding include North Street Swords; Round Tower Swords; Knocksedal Bridge; Skephubble; Mooretown; Newtown; Oldtown etc. The Swords area is prone to historic flooding at Pinnock Hill and several area indicative of a 1% AEP risk on the PFRA mapping
Portmarnock and Malahide areas	FEM FRAM shows extensive flooding on both sides of the Sluice river between R106, the railway line, Beechwood and Portmarnock Bridge. Similarly, flooding was observed at the upstream of the railway crossing on the Sluice River and Hazelbrook Stream. Model Results also showed that the entire reach of the Hazelbrook Stream from the railway crossing is liable to extensive flooding, particularly on west side of the river. The areas adjacent to the Gaybrook Stream are also liable to flooding. These areas are also indicative of a 1% AEP risk on the PFRA mapping
Kinsealy Lane	FEM FRAM shows extensive flooding upstream of the Sluice River crossing at by the R107 at Kinsealy Lane area and Kinsealy hall, upstream of Hydrometric Station 08005. The model results also that the area north to Dublin Airport between Forestown South and Forest Crest, in the vicinity of Forest Little stream crossing by the local road is liable to extensive flooding. These areas are also indicative of a 1% AEP risk on the PFRA mapping
Ballymacartle Area	FEM FRAM shows mapping extensive flooding at the crossing of a local road by the Wad stream located to North of Ballymacartle.
St Margaret's, Dublin Airport, Belcamp and Balgriffin areas	FEM FRAM shows flooding around Mayne/M50 flyover on the Old Airport and north of M50 Dardistown area. Extensive flooding was also found at the south-east corner of Dublin Airport; at upstream of M1 crossing by the Cuckoo stream; at the south-west side of M1/Airport junction; and to the west of railway line near Snugborough and Grange area. Modelling results also showed flooding at Stockhole lane between Cuckoo and Kealys streams. The results also showed the area north of St. Margaret's is also liable to pluvial flooding. These areas are also indicative of a 1% AEP risk on the PFRA

## 5.8 CLIMATE CHANGE SENSITIVE AREAS

### 5.8.1 Overview

The flood zones are generated without the inclusion of climate change factors. Due to the uncertainty surrounding the potential effects of climate change a precautionary approach is recommended. Areas that are potentially sensitive to climate change were reviewed and are discussed below.

## 5.8.2 FEM FRAM Study

The FEM FRAM Study carried out sensitivity analysis on the climate change effects of the watercourses modelled. The climate change sensitivity results are summarised in **Table 5.4** below. Two Scenarios were analysed the Mid-Range Future Scenario (MRFS) and the High End Future Scenario (HEFS). MRFS is defined in the FEM FRAM as the most likely climate change scenario, characterised by 20% increase in rainfall, 350 mm rise in sea level and 100% increase in urbanisation. HEFS is defined in the FEM FRAM as an extreme climate change event, characterised by 30% increase in rainfall, 1000 mm rise in sea level and 400% increase in urbanisation.

**Table 5.5 Summary of watercourses and areas affected by climate change identified in the FEM FRAM Study**

Watercourse	Climate Change Impact	Worst Affected Areas
Broadmeadow River	For the MRFS and HEFS the increase in flows does not result in a significant increase in flood extents and flood risk. The average water level increase between the current scenario is 0.10m and 0.16m for the 1% AEP MRFS and HEFS respectively.	Oldtown northwest of Swords showed the largest average increase in water level of 0.18m and 0.32m for the 1% AEP MRFS and HEFS respectively.
Ward River	The average water level increase between the current scenario is 0.08m and 0.12m for the 1% AEP MRFS and HEFS respectively.	Swords town centre is the worst affected area particularly with increases in tide levels increases the flood risk. The worst affected area is the confluence of the Ward and Broadmeadow Rivers with a maximum increase of 0.62m and 0.73m for the MRFS and HEFS respectively.
Lissenhall Stream	The average water level increase between the current scenario is 0.15m and 0.22m for the 1% AEP MRFS and HEFS respectively.	The most significant increase in flooding resulting from these increases in water levels is at the downstream extent of the river at Ballymadrough and Seapoint where the river bed slope is flat near and on a tributary originating in Lanestown, just upstream from the M1 culvert, where the constriction of the structure creates a significant head loss and backwater effect.
Turvey River	The average water level increase between the current scenario is 0.12m and 0.28m for the 1% AEP MRFS and HEFS respectively.	The largest increase in water level occurs just upstream of the M1 culvert (Straffordstown), where the constriction of the culvert creates a significant head loss and a backwater effect.  The increase in water levels results in a marginal increase in extents, with the exception of the downstream end of the model where the increase in extents is more defined.
Delvin	The average water level increase between the current scenario is 0.07m and 0.08m for the 1% AEP MRFS and HEFS respectively.	The largest increases in water level occur near the mouth of the river. The increases in water levels result in marginal increase in extents along the modelled watercourses.
Ballyboghil	The average water level increase between the current scenario is 0.09m and 0.17m for the 1% AEP MRFS and HEFS respectively.	The maximum difference is 0.34m and is located at the confluence with the Corduff and the Rogerstown estuary near Blake's Cross. The largest increase in flood risk is around the Rogerstown estuary which is primarily as a result of the increase in sea levels.

		There is a limited increase in flood risk along the fluvial reaches of the watercourse.
Corduff	The average water level increase between the current scenario is 0.09m and 0.16m for the 1% AEP MRFS and HEFS respectively.	The maximum difference is 0.34m and is located in the tidal reaches of the watercourse at the confluence with the Ballyboghil and the Rogerstown estuary and is primarily as a result of increases in mean sea levels. Along the fluvial reaches of the Corduff River there is a limited increase in flooding associated with the MRFS.
Balbriggan (North)	For the MRFS, flooding along Drogheda Street starts at higher order AEP events.	For the 0.1% AEP event, there is a sizeable increase in flooding with flooding extending to Moylaragh Crescent and Moylaragh Park.
Bracken River	The average water level increase between the current scenario is 0.11m and 0.49m for the 1% AEP MRFS and HEFS respectively.	High differences occur principally at the downstream end of the model, within Balbriggan, where the water level is controlled by the tide. The largest difference occurs just upstream of the M1 culvert at Courtlough where the constriction caused by the bridge creates a significant head loss and backwater effect upstream.
Mill Stream	The average water level increase between the current scenario is 0.07m and 0.12m for the 1% AEP MRFS and HEFS respectively.	The MRFS flood map indicates that there is a sizeable increase in flooding towards the downstream end of Mill Stream along the R128 road. This is also where the maximum difference in water levels occurs between the current scenario and MRFS (0.43m) and is primarily as a result of increases in the mean sea level associated with the MRFS.
Gaybrook Stream	The average water level increase between the current scenario is 0.28m and 0.37m for the 1% AEP MRFS and HEFS respectively.	The maximum difference between the current scenario and the MRFS is 2.19m. The large differences in water levels between the current scenario and MRFS are as a result of surcharging of the culvert during high flows.
Mayne River	The average water level increase between the current scenario is 0.21m and 0.39m for the 1% AEP MRFS and HEFS respectively.	The maximum difference between the current scenario and the MRFS is 1.07m and is located just upstream of a dual culvert at section near Dardistown.
Sluice	The average water level increase between the current scenario is 0.15m and 0.21m for the 1% AEP MRFS and HEFS respectively.	Along the fluvial reaches of the watercourse there is a marginal increase in flood extents associated with the MRFS. Towards the downstream extent of the modelled watercourse, there is a more obvious increase in flood extents which is associated with the increase in mean sea levels.
Baleally Stream	The average water level increase between the current scenario is 0.23m and 0.43m for the 1% AEP MRFS and HEFS respectively.	The maximum difference between the current scenario and the MRFS is 0.68m and is located just upstream of a long culvert between flowing underneath the Chapel Farm area. The increase in levels results in an increased flood risk in Lusk with the flood maps indicating flooding in Lusk for the 0.1% AEP MRFS event.
Bride's Stream	The average water level increase between the current scenario is 0.14m and 0.29m for the 1% AEP MRFS and HEFS respectively.	The maximum difference between the current scenario and the MRFS is 0.36m and is located just upstream of a structure with a low conveyance capacity at section adjacent to the R127 on the north side of Lusk. The MRFS maps indicate that the largest increase in flood risk is at the downstream extent of the model as a result of the increase in mean sea levels associated with the MRFS.

Rush West Stream	The average water level increase between the current scenario is 0.08m and 0.17m for the 1% AEP MRFS and HEFS respectively.	The maximum difference between the current scenario and the MRFS is 0.35m and occurs at the downstream end of the modelled watercourse where the water level is controlled by the outfall and the tide. A comparison of the fluvial and tidal current scenario and MRFS flood extent maps shows that the increase in mean sea level results in the largest increase in flood risk.
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### 5.8.3 Preliminary Flood Risk Assessment - Portrane

As briefly discussed in section 5.4 Portrane was subject to Preliminary Flood Risk Assessment. The results of the study for coastal flooding with a current scenario broadly agreed with the results of the FEM FRAM analysis.

However under climate change scenarios more properties are at risk from tidal flooding due to sea level rise and continuing coastal erosion which could allow tidal flooding to progress further inland. Potentially affected areas include the edge of estuary on Marsh road and the Burrow road and at the northern end of the Burrow. The central region of the Burrow becoming flooded is dependent on future rates of coastal erosion. The study recommended that a more detailed assessment be carried out to identify areas where coastal defences could be constructed to prevent tidal flooding and prevent further erosion.

### 5.8.4 Non-Modelled Areas

The guidelines recommend 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. The non-modelled climate change areas include the Tolka Catchment and the PFRA infilled areas. The current ECFRAM scenario flood extents were also reviewed as part of this exercise to establish an indication of future risk in areas outside of the scope of the FEM FRAM and Tolka Studies. **Table 5.5** outlines areas that are potentially sensitive to climate change impacts using Flood Zone B as an indicator.

**Table 5.6 Areas sensitive to climate change flood risk using Flood Zone B as an indicator**

River	Affected Areas	Comments
Tolka	Damastown Macetown Mulhuddart	Relative to Flood Zone A, there is a significant increase in Flood Zone B in the listed affected areas. Refer to the SFRA mapping.
Coastal	Sutton Howth	Relative to Flood Zone A, there is a significant increase in Flood Zone B in the listed affected areas. Refer to the draft ECFRAM coastal flooding mapping.

## 6 LAND ZONINGS CONSIDERED FOR REVIEW

### 6.1 INTRODUCTION

The zonings in the following areas have been reviewed against the flood zone mapping produced for the SFRA as described in section 5.6, the pluvial risk as discussed in section 5.7.3 and the sensitivity of flood extent to climate change. 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 **Table 6.1**. Justification Tests as applicable are shown in Appendix B.

**Table 6.1 Land Use Zoning and Vulnerabilities**

Objective	Vulnerability	Justification Test Required
C1.2- Retail Warehousing	Less	For Development in Flood Zone A
C2.1 - Food Park	Less	For Development in Flood Zone A
C2.2- Heavy Industry	Less	For Development in Flood Zone A
C3 - High Technology	Less	For Development in Flood Zone A
C4 - Warehousing and Distribution	Less	For Development in Flood Zone A
C6 - General Employment	High / Less	For highly vulnerable development in Flood Zone A or B For less vulnerable development in Flood Zone A
C7 - Rural Business	Less	For Development in Flood Zone A
G3 - Greenbelt / High Amenity	Less / Water Compatible	For highly vulnerable development in Flood Zone A or B For less vulnerable development in Flood Zone A
G4 - Open Space	Less	For Development in Flood Zone A
M1 - Metro Economic Corridor	High / Less	For highly vulnerable development in Flood Zone A or B For less vulnerable development in Flood Zone A
M2 - Town / District / Rural Centre	High / Less	For highly vulnerable development in Flood Zone A or B For less vulnerable development in Flood Zone A
M3 Local Centre	High / Less	For highly vulnerable development in Flood Zone A or B For less vulnerable development in Flood Zone A
N1.3 Dublin Airport	High	For Development in Flood Zone A or B
P1 Rural	Less	For Development in Flood Zone A
R1 Residential Area	High	For Development in Flood Zone A or B
R2 Residential	High	For Development in Flood Zone A or B
R2 Rural Clusters	High / Less	For highly vulnerable development in Flood Zone A or B For less vulnerable development in Flood Zone A
S5 Community Infrastructure	High / Less	For highly vulnerable development in Flood Zone A or B For less vulnerable development in Flood Zone A

### 6.1.1 Fingal North - Courtlough

Lands at Courtlough, as shown in **Figure 6.1**, are subject to a C6 zoning objective which is classified as less vulnerable development. The southern end of the zoning is currently undeveloped and has a significant Flood Zone A and B extent. This area was also identified as being susceptible to pluvial flood risk and increased flood extents under climate change scenarios. Development in Flood Zone A for these lands requires a Justification Test, included in Appendix B. The northern end of the zoning is already developed with a flood extent along the boundary any future expansion of this development must be reviewed in terms of flood risk and an appropriately detailed FRA submitted with any planning application.

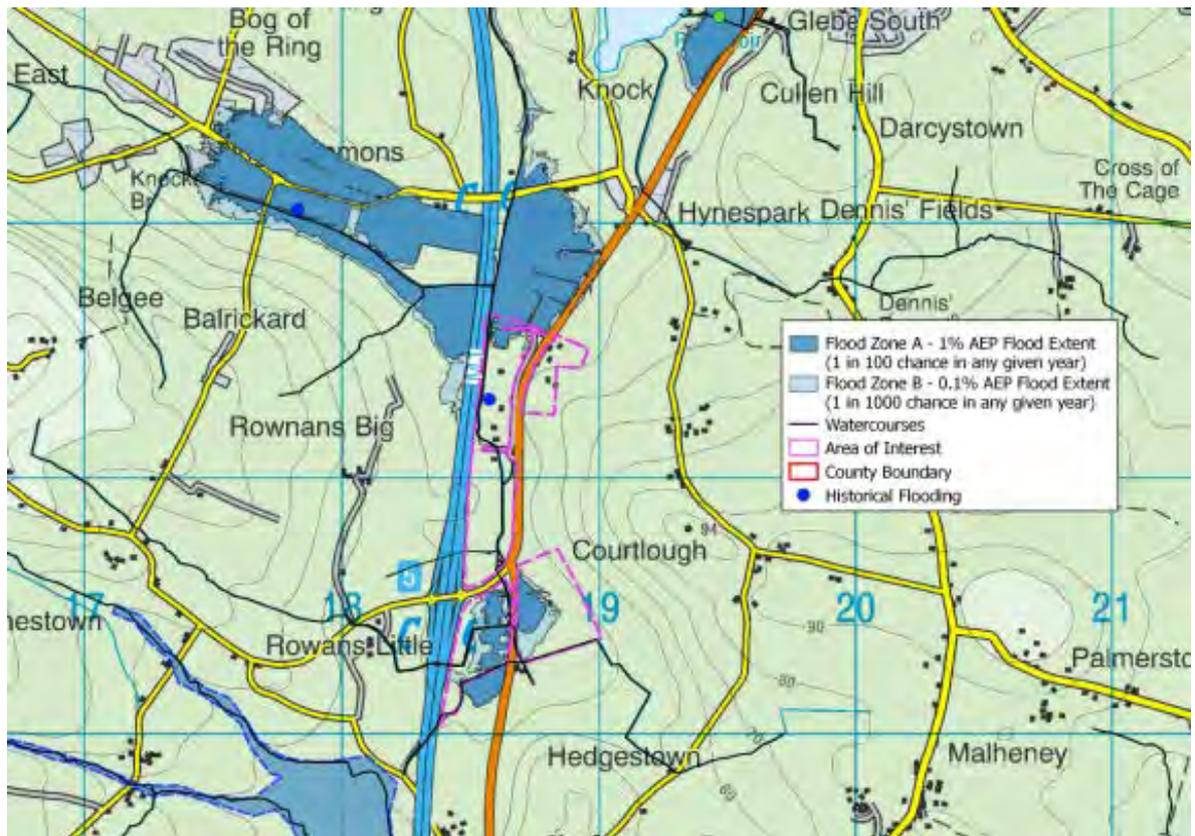


Figure 6.1 Courtlough

### 6.1.2 Fingal Central - Ballymadun

Lands at Ballymadun, as shown in **Figure 6.2**, are subject to a C6 zoning objective under the 2011-2017 County Development Plan as shown which is classified as less vulnerable development. The land is currently undeveloped. The watercourses in this area were outside the scope of the FEM FRAM flood zone mapping. The OPW PFRA mapping provides an indication that there may be a flood risk to the lands adjacent to the Hurley River. It was recommended that the lands adjacent to the Hurley River be subject a Stage 2 FRA to identify more accurately the flood risk in the area before any development or zoning is considered for this site. FCC passed a Justification Test which is included in Appendix B, requiring that a site specific FRA be undertaken as a condition for development on the site.

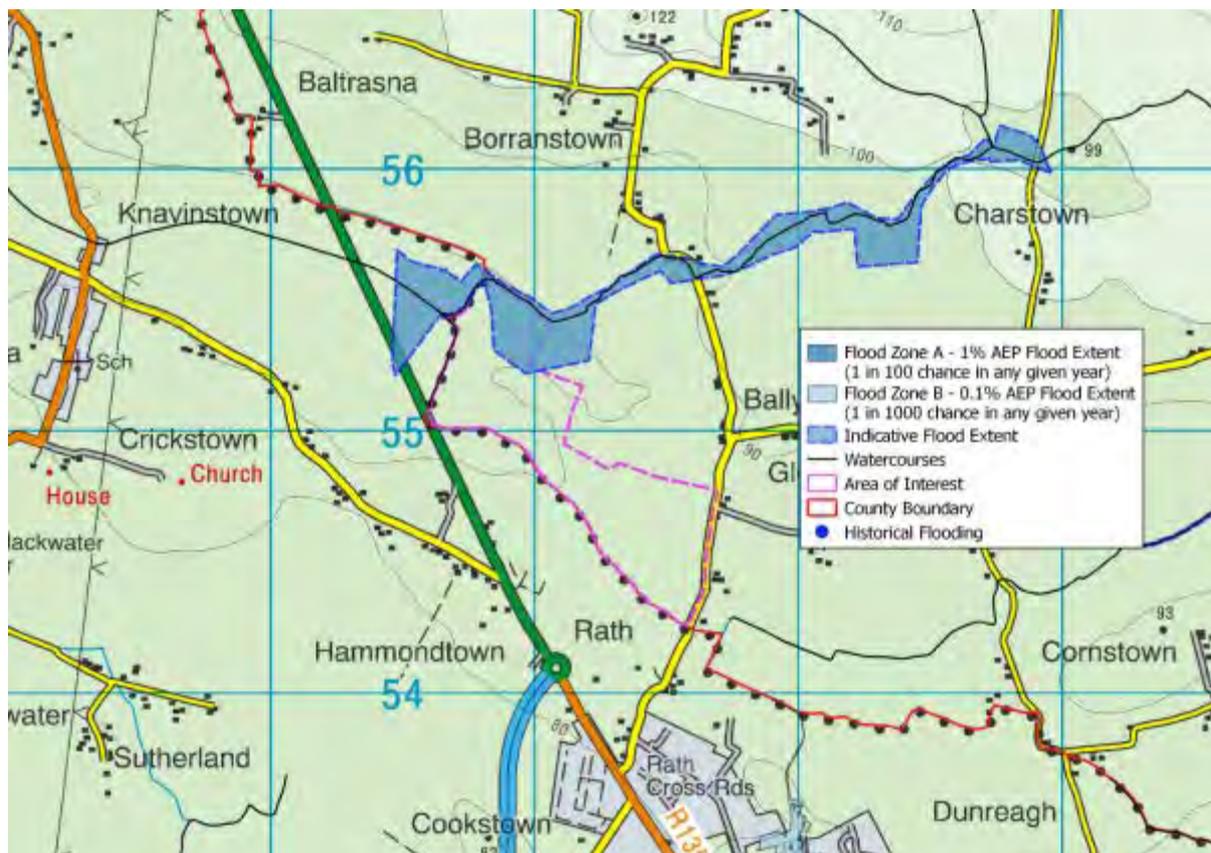


Figure 6.2 Ballymadun

### 6.1.3 Fingal Central - Rolestown

Lands at Rolestown are subject to an M2 zoning objective under the 2011-2017 County Development Plan as shown in **Figure 6.3**. As it is an existing settlement the current land zoning is appropriate but it is recommended that any highly vulnerable development should be avoided in the Flood Zones A and B with less vulnerable development subject to a detailed FRA. As described in section 4.4.2 the Justification Test would not apply to minor development to existing buildings in this area, 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. As described in section 5.4.1, a flood defence scheme was constructed in Rolestown. It is recommended that any flood risk assessments in this area should be cognisant of these defences.



Figure 6.3 Rolestown

### 6.1.4 Fingal Central - Ballyboughal

Lands at Ballyboughal are subject to an M2 zoning objective under the 2011-2017 County Development Plan as shown in **Figure 6.4**. As it is an existing settlement the current land zoning is appropriate but it is recommended that any highly vulnerable development should be avoided in the Flood Zones A and B with less vulnerable development subject to a detailed FRA. As described in section 4.4.2 the Justification Test would not apply to minor development to existing buildings in this area 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.

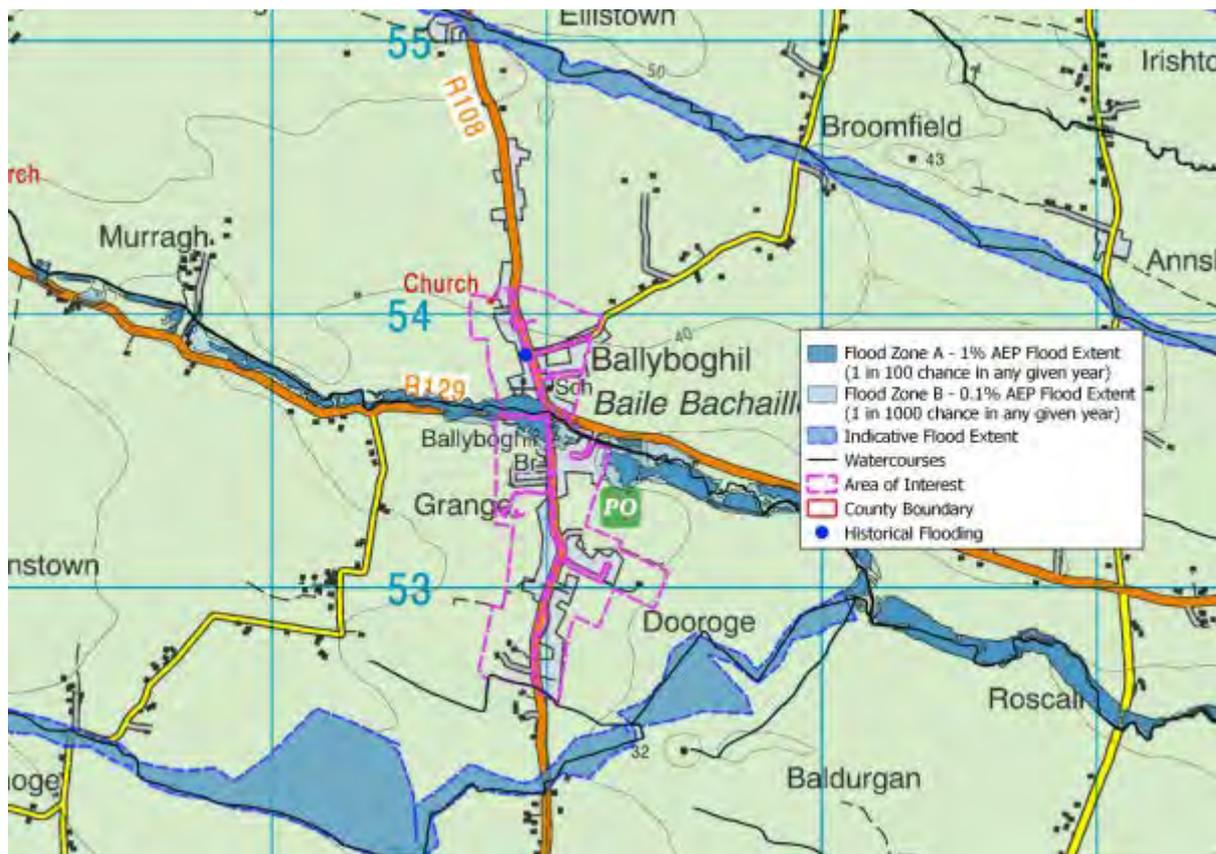


Figure 6.4 Ballyboughal

### 6.1.5 Fingal Central - Coolatrath

Lands at Coolatrath are subject to a C7 zoning objective under the 2011-2017 County Development Plan as shown in **Figure 6.5** which is classified as less vulnerable development. The land is currently undeveloped and it is recommended that any highly vulnerable development should be avoided in the Flood Zones A and B with less vulnerable development subject to a detailed FRA in Flood Zone A. The FRA should address surface water and drainage, mitigation measures, residual risk and appropriate land use with respect to vulnerability of the proposed development type.



Figure 6.5 Coolatrath

### 6.1.6 Skerries

Lands near Skerries as shown in **Figure 6.6** are subject to a C6 zoning objective which is classified as less vulnerable development. The land is currently undeveloped and has a significant Flood Zone A and B extent. This area was also identified as being susceptible to pluvial flood risk adjacent to the railway and increased flood extents under climate change scenarios. Development in Flood Zone A for these lands requires a Justification Test, included in Appendix B.

Also shown in **Figure 6.6** are existing residential areas that overlap with Flood Zones A and B. As it is an existing settlement the current land zoning is appropriate but it is recommended that any highly vulnerable development should be avoided in the Flood Zones A and B with less vulnerable development subject to a detailed FRA. As described in section 4.4.2 the Justification Test would not apply to minor development to existing buildings in this area, 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.

The FEM FRAM proposed flood relief scheme for Skerries included improvements to the culverts downstream of this site which could reduce the flood extent in the zoned lands. Any mitigation measures that may be proposed for this site should be cognisant of the proposals for the Skerries flood relief scheme. The OPW are currently reviewing options for updating the flood zone mapping for Skerries. It is anticipated that this work will be carried out in 2017. Therefore the best available information currently is the FEM FRAM mapping which will be used for the County Development Plan until the completion of the review for Skerries. Following the review, the FCC SFRA will be updated to reflect the more up to date information.

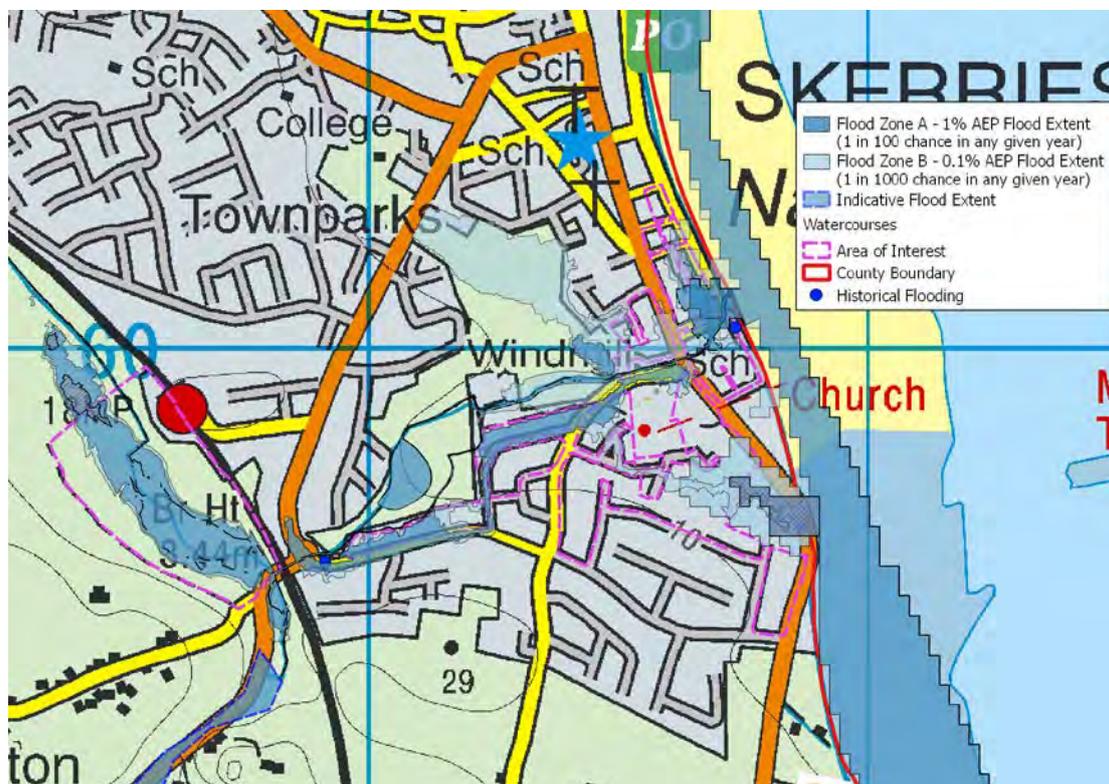


Figure 6.6 Skerries

### 6.1.7 Rush

Lands adjacent to the West Rush Stream are shown in **Figure 6.7** and are subject to a P1 zoning objective, which could facilitate highly and less vulnerable development. The land is currently a mixture of residential and agricultural and has a significant Flood Zone A and B extent. This area was also identified as being susceptible to pluvial flooding particularly north of the flood extents along the Whitestown Road. This area is also at risk from climate change scenarios where the largest increase in extents is due to coastal flooding. The FEM FRAM proposed flood relief scheme for Rush included improving conveyance by constructing secondary culvert along Channel Road to protect properties at risk from fluvial flooding along the West Rush stream. It is recommended that any highly vulnerable development should be avoided in the Flood Zones A and B with less vulnerable development subject to a detailed FRA in Flood Zone A. The FRA should address surface water and drainage, mitigation measures, residual risk and appropriate land use with respect to vulnerability of the proposed development type. Any mitigation measures that may be proposed for this area should be cognisant of the proposals for the Rush flood relief scheme.

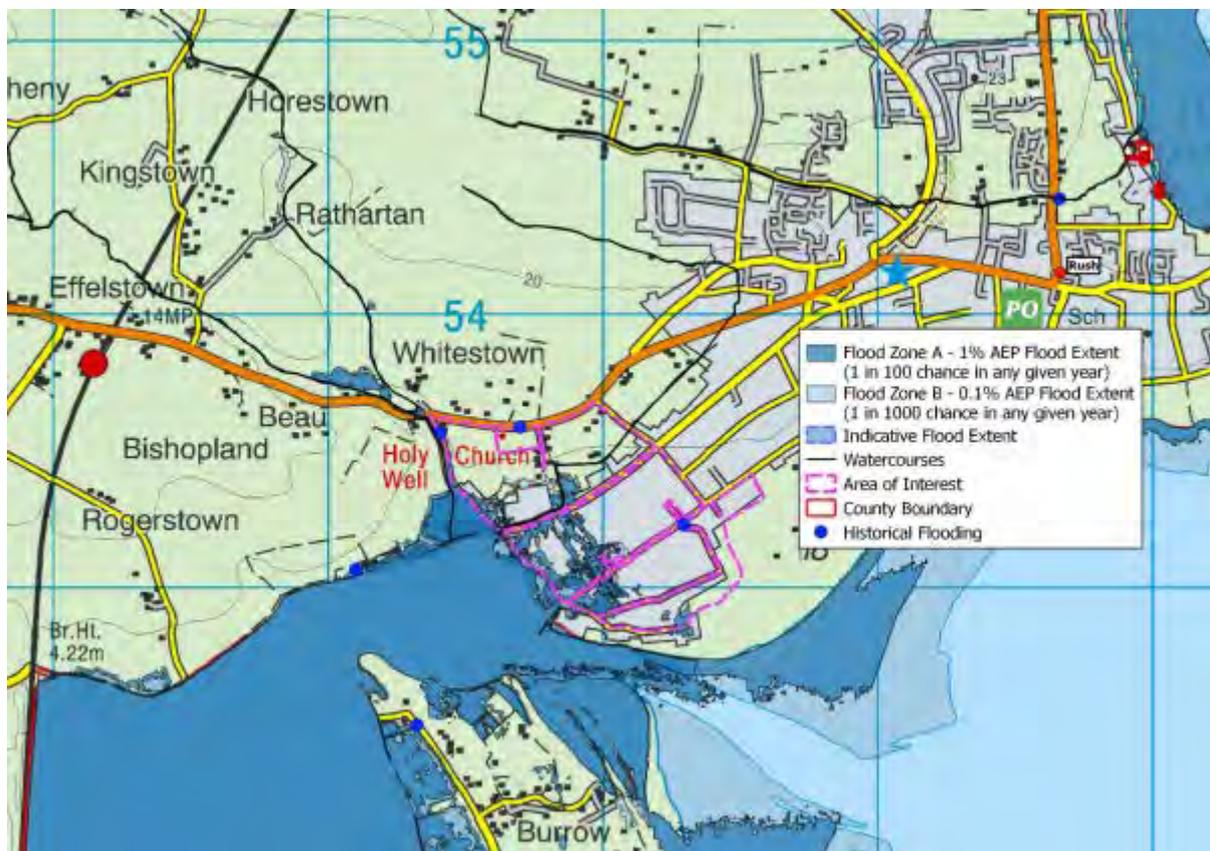


Figure 6.7 Rush

### 6.1.8 Donabate / Portrane – Blakescross

The lands identified in **Figure 6.8** at Blakescross are subject to a C7 zoning objective under the 2011-2017 County Development Plan which is classified as less vulnerable development. The land west of the Corduff River is developed while it is undeveloped on the east side. Justification Test is included in Appendix B which recommends that a site specific flood risk assessment be carried out for any planning applications for the area. The FRA should address surface water and drainage, mitigation measures, residual risk and appropriate land use with respect to vulnerability of the proposed development type. Highly vulnerable development should be avoided in the Flood Zones A and B with less vulnerable development subject to a detailed FRA in Flood Zone A. Any future expansion of the development in the western zoned lands must be reviewed in terms of flood risk and an appropriately detailed FRA submitted with any planning application.

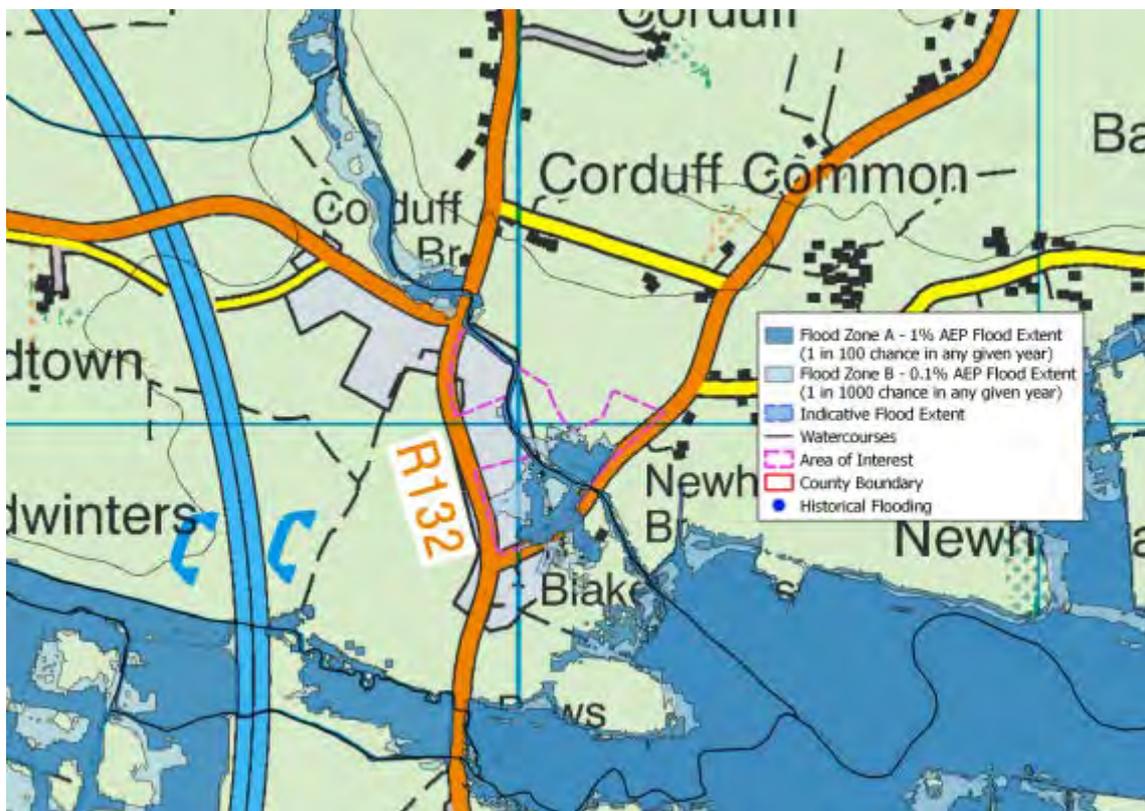


Figure 6.8 Blakescross

### 6.1.9 Donabate / Portrane – Lanestown

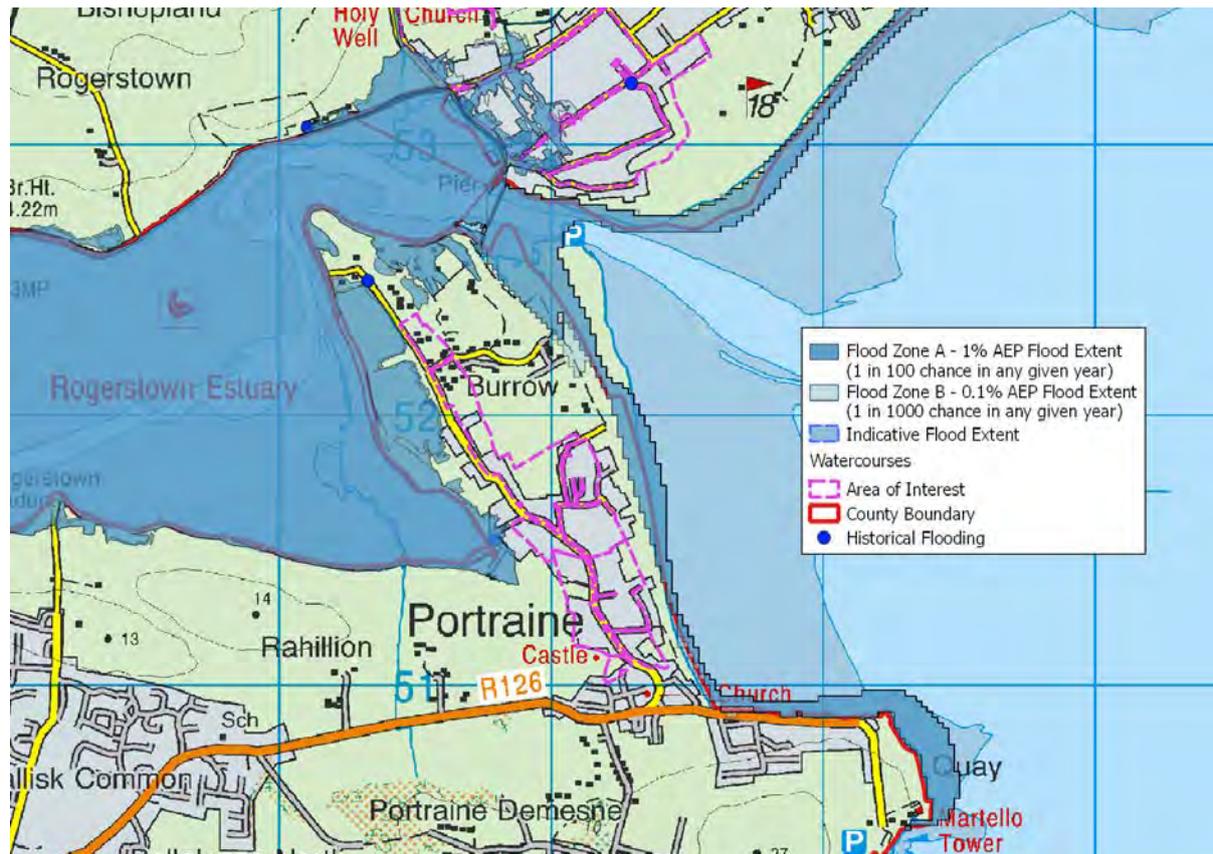
**Figure 6.9** shows lands with a C6 zoning objective which is classified as less vulnerable development. The land is currently a mixture of industrial / commercial development and agricultural land with a significant Flood Zone A and B extent. Any future expansion of the industrial / commercial development lands must be reviewed in terms of flood risk and an appropriately detailed FRA submitted with any planning application.



**Figure 6.9 Lanestown**

### 6.1.10 Donabate / Portrane – Burrow

**Figure 6.10** shows lands in Portrane, which have a P1 and R2 zoning objective which could facilitate highly and less vulnerable development. The land is currently a mixture of residential and agriculture. The flood extents are confined to the G3 zoning which has an appropriate vulnerability classification for flood risk areas. However as discussed in Section 5.8.3 there is a residual risk to properties in the central area of Burrow from increased flood extents under climate change conditions. An appropriately detailed FRA should be submitted with any planning application addressing this residual risk.



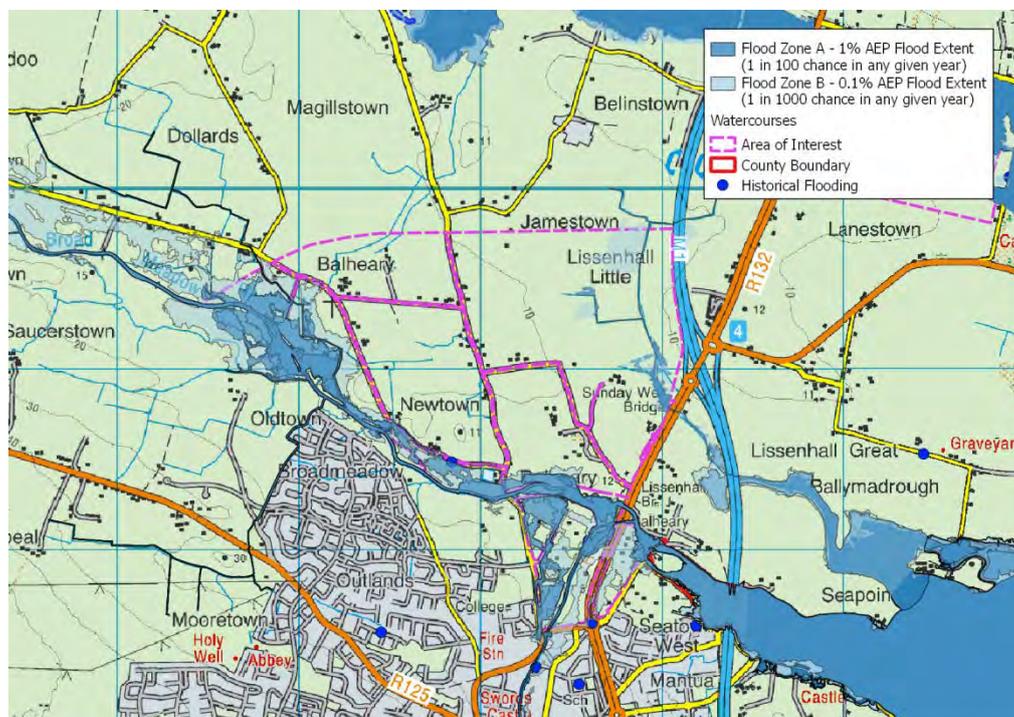
**Figure 6.10** Burrow, Portrane

### 6.1.11 Swords – Lissenhall

Greenfield lands at Lissenhall as shown in **Figure 6.11** were identified as an area for a future strategic study to promote the development of a planned sustainable mixed-use urban development area which will be fully integrated with the Dublin Metro North project which may extend into this area. The lands are currently subject to a P1 zoning objective under the 2011-2017 County Development. This zoning would be considered to be less vulnerable.

**Figure 6.11** shows the flood zones generated for Lissenhall as part of the FEM FRAM study. The Metro North Environmental Impact Statement identified a number of ditches in the Lissenhall zoning that form part of a field drainage system within the study area. This drainage system generally drains south towards the Broadmeadow River. The Bellinstown FRA for the Metro North Depot at Belinstown identified localised flooding along the Lissenhall stream, upstream of the culverts at the R123 and the M1. This problem is due to limited flow capacity and undersized/blocked culverts as identified on the SFRA flood mapping. This area is also at risk from pluvial flooding due to ponding during high rainfall as identified in the Metro North Railway Order Application - Further Information Request, Item 4 Flood Risk Assessment. The climate change scenarios for the Lissenhall stream also identified the area upstream from the M1 culvert as susceptible to increased flooding. The Bellinstown FRA recommended that improvements in the road drainage system, channel cleaning/regrading and culvert replacement works along the Lissenhall stream be undertaken prior to any development.

Batter Lane to the north of the Lissenhall site in Bellinstown was also identified in the Metro North Railway Order Application - Further Information Request, Item 4 Flood Risk Assessment, as being susceptible from overland flooding. It is likely the field drainage network has inadequate capacity during rainfall events. A Justification Test for the site is included in Appendix B.



**Figure 6.11 Lissenhall**

### 6.1.12 Swords – Balheary

The Balheary area in the north of Swords town has an M1 zoning objective under the 2011-2017 County Development Plan as shown in **Figure 6.12**. The area is already heavily industrialised and lies within a significant flood extent for Flood Zone A and B. This area was also identified as being subject to increased flood extent under climate change scenarios due to its proximity to the confluence of the Ward and Broadmeadow Rivers, with maximum increase water levels of 0.62m and 0.73m for the MRFS and HEFS respectively. Any future expansion of the industrial / commercial development lands must be reviewed in terms of flood risk and an appropriately detailed FRA submitted with any planning application. Highly vulnerable development should be avoided in the Flood Zones A and B with less vulnerable development subject to a detailed FRA in Flood Zone A.

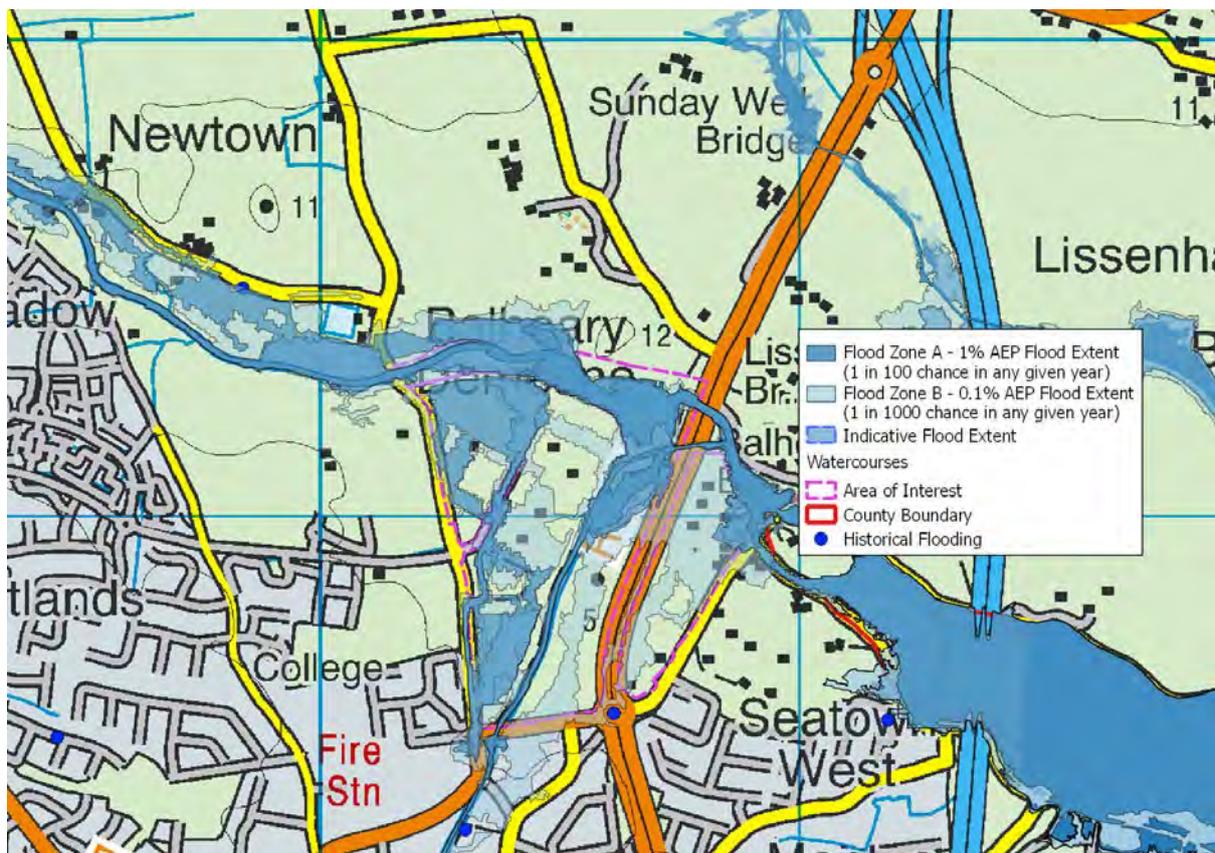


Figure 6.12 Balheary

### 6.1.13 Malahide / Portmarnock – Malahide

Malahide Town Centre has an M2 zoning objective which could have both highly and less vulnerable development. The FEM FRAM study identified that the town centre was at risk from coastal flooding as shown in **Figure 6.13** and recommended the construction of demountable flood defences and embankments to protect at risk properties. It is recommended that any highly vulnerable development should be avoided in the Flood Zones A and B with less vulnerable development subject to a detailed FRA in Flood Zone A. The FRA should address surface water and drainage, mitigation measures, residual risk and appropriate land use with respect to vulnerability of the proposed development type. Any mitigation measures that may be proposed for this area should be cognisant of the proposals for the Malahide flood relief scheme.

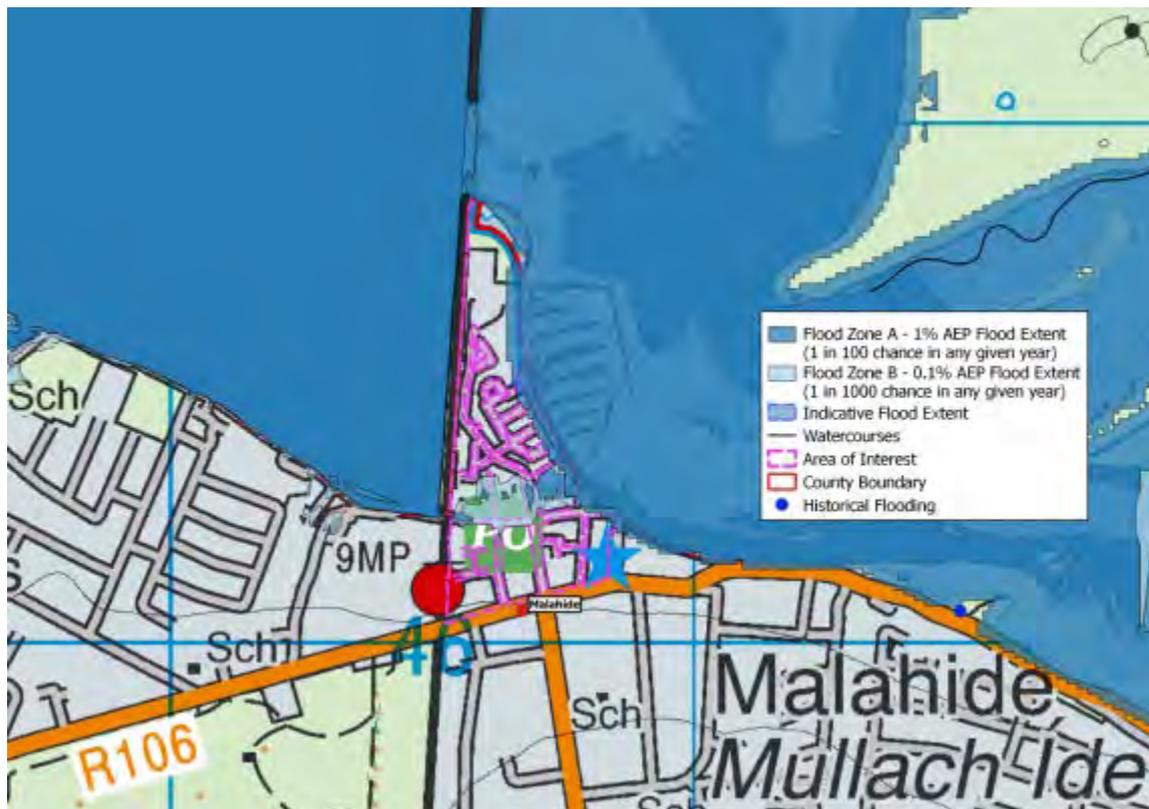


Figure 6.13 Malahide

### 6.1.14 Malahide / Portmarnock - Streamstown

Lands in Streamstown south of Malahide have R1 and R2 zoning objectives which is considered highly vulnerable development. The SFRA flood zones show a significant Flood Zone A adjacent to the Sluice River in these areas. The OPW are currently reviewing options for updating the flood zone mapping for Streamstown in Malahide. It is anticipated that this work will be carried out in 2017. Therefore the best available information currently is the FEM FRAM mapping which will be used for the County Development Plan until the completion of the review for Streamstown. Following the review, the FCC SFRA will be updated to reflect the more up to date information. As described in section 4.4.2 the Justification Test would not apply to minor development to existing buildings in this area, 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.

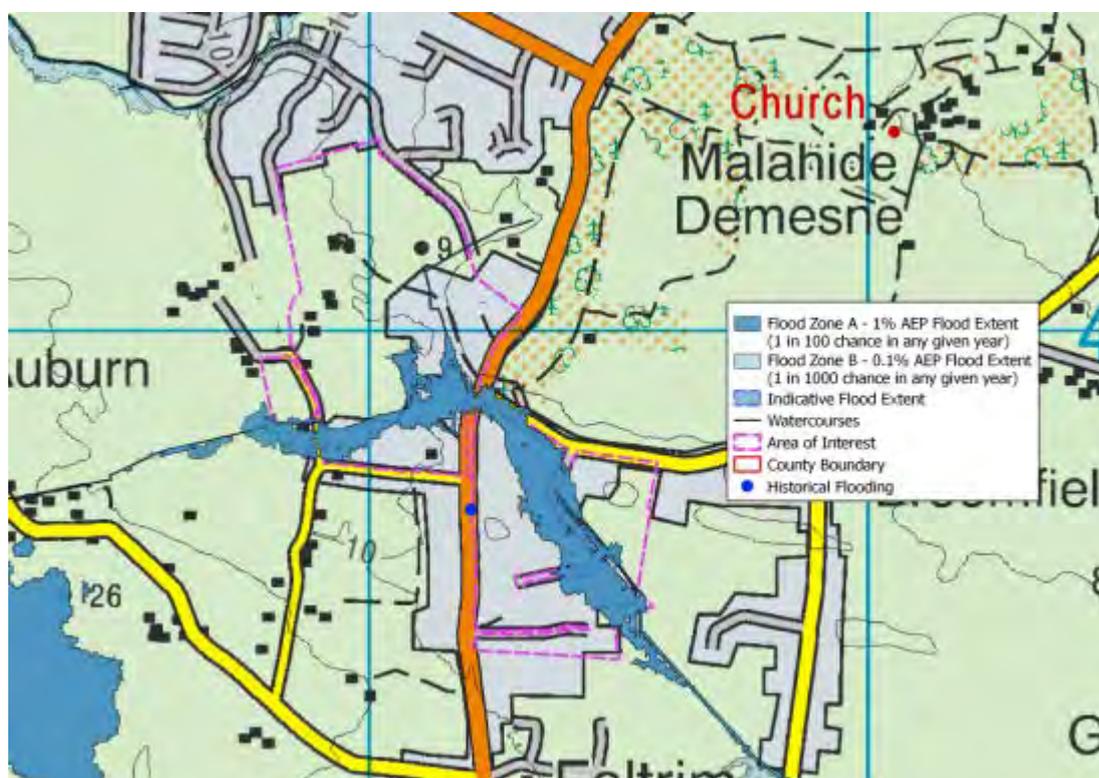


Figure 6.14 Streamstown

### 6.1.15 Malahide / Portmarnock – Balgriffin

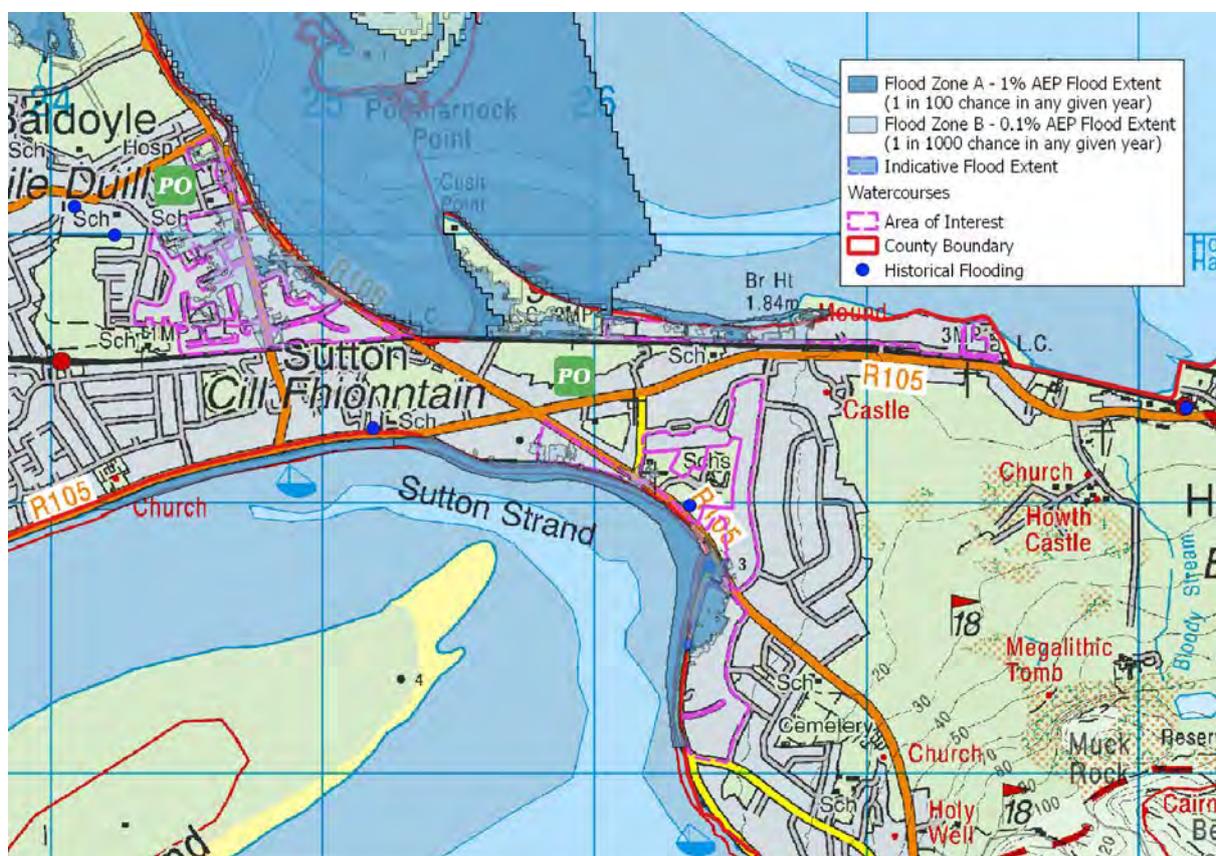
**Figure 6.15** shows lands in Balgriffin which have a R2 zoning objective which is considered highly vulnerable development. The SFRA flood zones show a significant Flood Zone A adjacent to the Mayne River in these areas. This area is already developed with highly vulnerable residential properties and was identified as part of the FEM FRAM study as an area where flood relief works should be carried out. It is recommended that a site specific FRA be carried out for any planning applications for the area. The FRA should address surface water and drainage, mitigation measures, residual risk and appropriate land use with respect to vulnerability of the proposed development type. As described in section 4.4.2 the Justification Test would not apply to minor development to existing buildings in this area, 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.



Figure 6.15 Balgriffin

### 6.1.16 Howth / Baldoyle / Sutton

**Figure 6.16** shows lands along Strand Road in Baldoyle / Sutton as well as Burrow Road Greenfield Road in Howth that are susceptible to flooding. The SFRA flood zones highlight some of these areas as being susceptible from 0.5% AEP and 0.1% AEP coastal flooding event. Howth is also subject to an ongoing Catchment Study which will identify flood relief options for the surface water system. The Howth catchment has significant drainage problems during storm events. It is recommended that a site specific flood risk assessment be carried out for any planning applications in these areas. The FRA should address surface water and drainage, mitigation measures, residual risk and appropriate land use with respect to vulnerability of the proposed development type. As described in section 4.4.2 the Justification Test would not apply to minor development to existing buildings in this area, 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.



**Figure 6.16** Howth, Baldoyle & Sutton

### 6.1.17 Blanchardstown North – Damastown, Macetown & Clonee

Lands in Damastown, Macetown and Clonee as shown in **Figure 6.17** are at risk from significant flooding identified by Flood Zones A and B. The flood relief works recommended in the Tolka Flooding Study have all been completed in these areas but there is still a residual risk associated with failure of these defences. The defended areas are shown in the flood zone mapping in Appendix A and any planning applications within these areas must be accompanied by a FRA addressing this residual risk. The undefended land is currently a mixture of industrial / commercial, residential and agricultural uses. Any future expansion of the industrial / commercial development lands must be reviewed in terms of flood risk and an appropriately detailed FRA submitted with any planning application. Any highly vulnerable development should be avoided in the Flood Zones A and B.

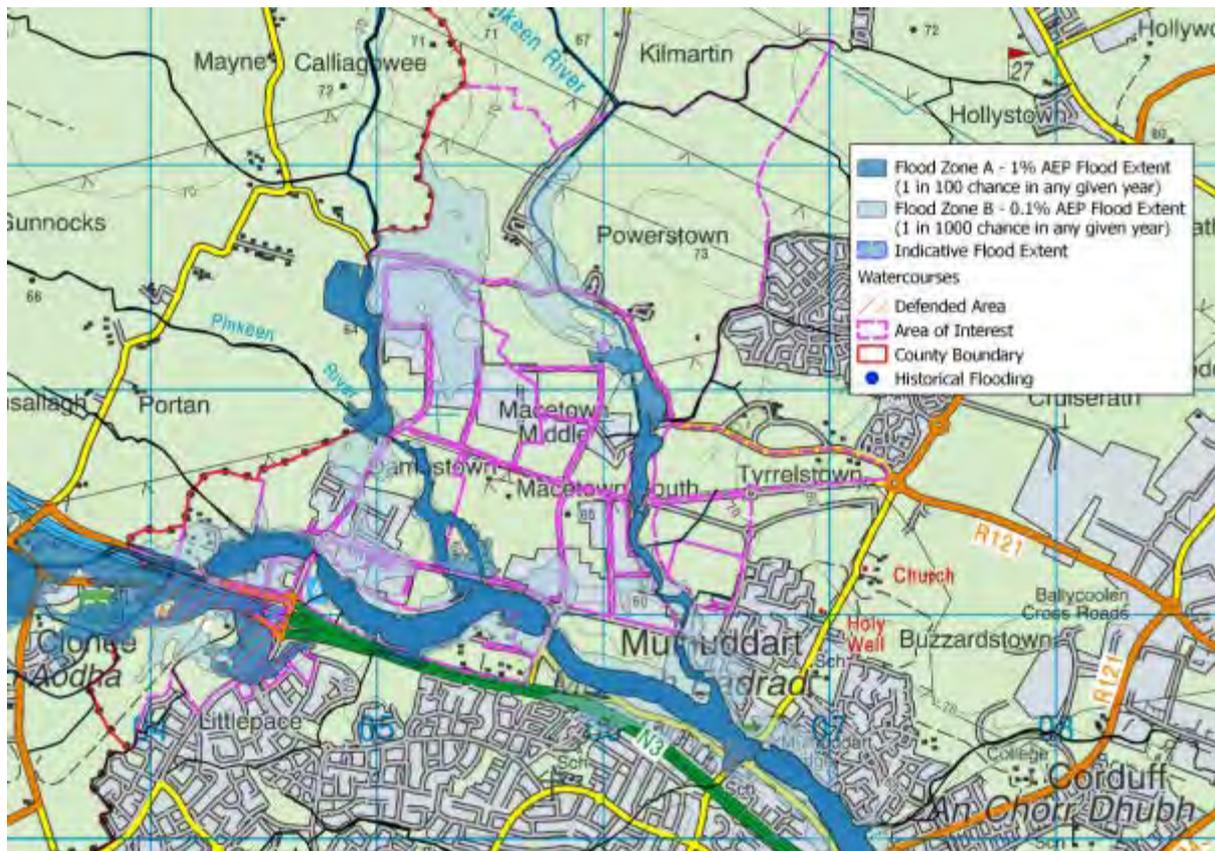


Figure 6.17 Damastown, Macetown & Clonee

### 6.1.18 Blanchardstown North – Mulhuddart

Lands in Mulhuddart as shown in **Figure 6.18** are at risk from significant flooding identified by Flood Zones A and B. The flood relief works recommended in the Tolka Flooding Study have all been completed in this area but there is still a residual risk associated with failure of these defences. The defended areas are shown in the flood zone mapping in Appendix A and any planning applications within these areas must be accompanied by a FRA addressing this residual risk. The undefended land is currently a mixture of industrial / commercial and residential uses. Any future expansion of the industrial / commercial development lands must be reviewed in terms of flood risk and an appropriately detailed FRA submitted with any planning application. Any highly vulnerable development should be avoided in the Flood Zones A and B.

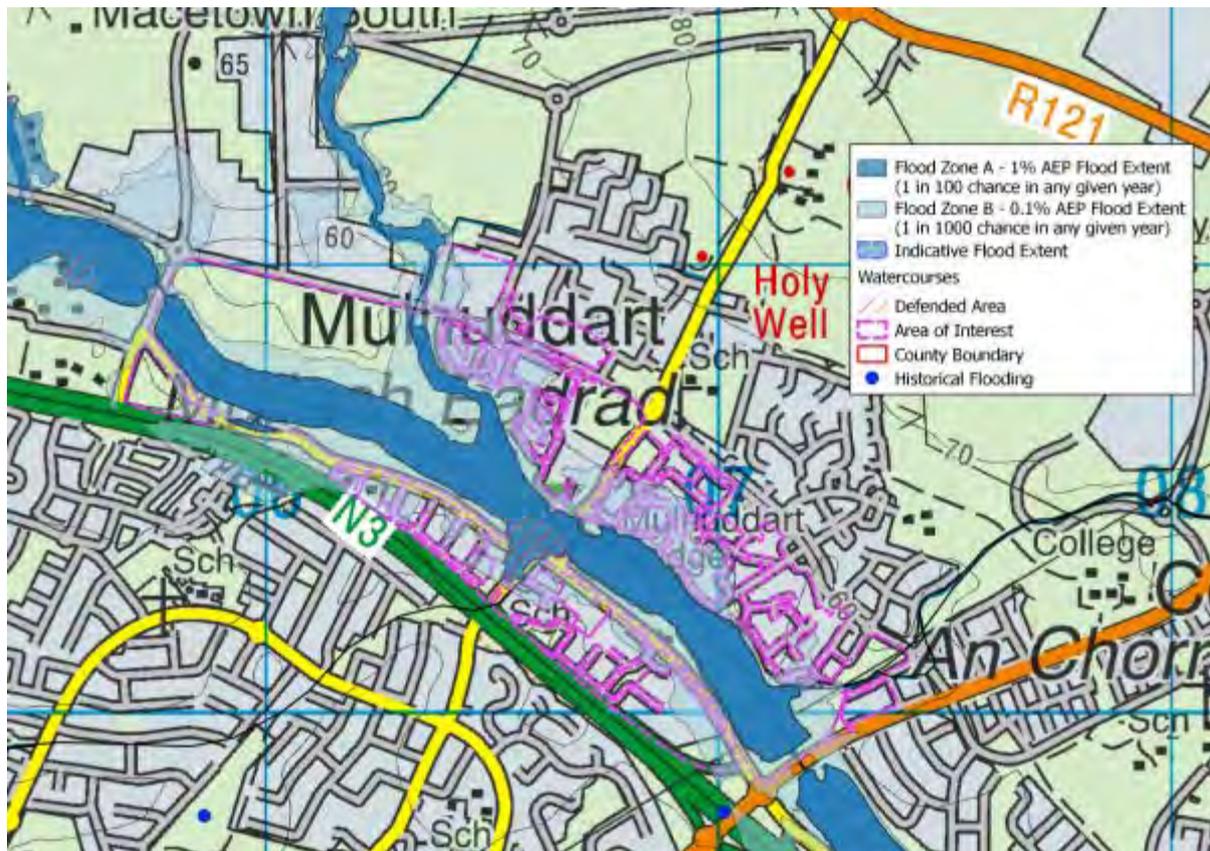


Figure 6.18 Mulhuddart

### 6.1.19 Balbriggan

The Balbriggan town centre is already fully developed and partially lies within a flood extent for Flood Zone A and B. The flood extents are largely confined to car parking areas and green areas adjacent to the Bracken River. To the north of the town centre there is also a Flood Zone B extent in the Lambeecher estate. Any future expansion of the industrial / commercial development lands in the town centre and redevelopment or new development in the Lambeecher estate must be reviewed in terms of flood risk and an appropriately detailed FRA submitted with any planning application. Highly vulnerable development should be avoided in the Flood Zones A and B with development subject to a detailed FRA where appropriate.



Figure 6.19 Balbriggan

### 6.1.20 Santry Close

Lands at Santry Close are an existing residential zoning. It is recommended that any future highly vulnerable development should be avoided in the Flood Zones A and B. As described in section 4.4.2 the Justification Test would not apply to minor development to existing buildings in this area, 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.

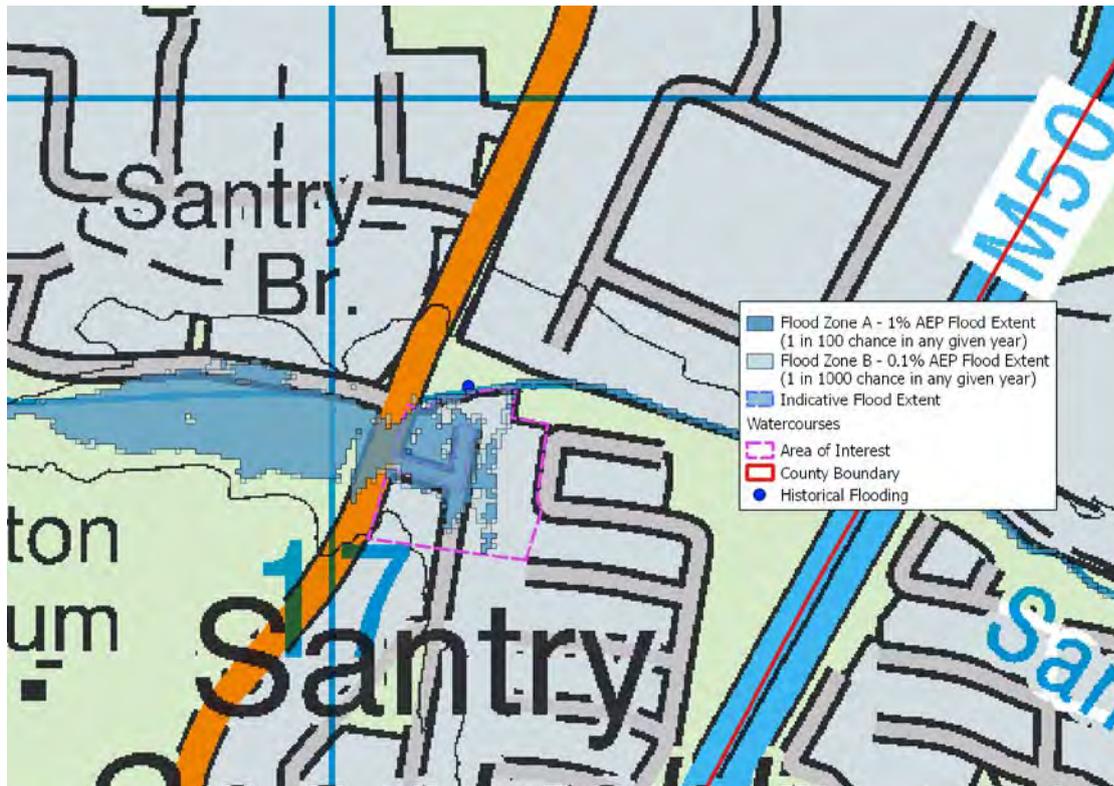


Figure 6.20 Santry Close

### 6.1.21 Airside

The Airside area in the south of Swords town is already heavily developed and lies within a flood extent for Flood Zone A and B. Any future expansion of the industrial / commercial development lands must be reviewed in terms of flood risk and an appropriately detailed FRA submitted with any planning application. Highly vulnerable development should be avoided in the Flood Zones A and B with less vulnerable development subject to a detailed FRA in Flood Zone A.

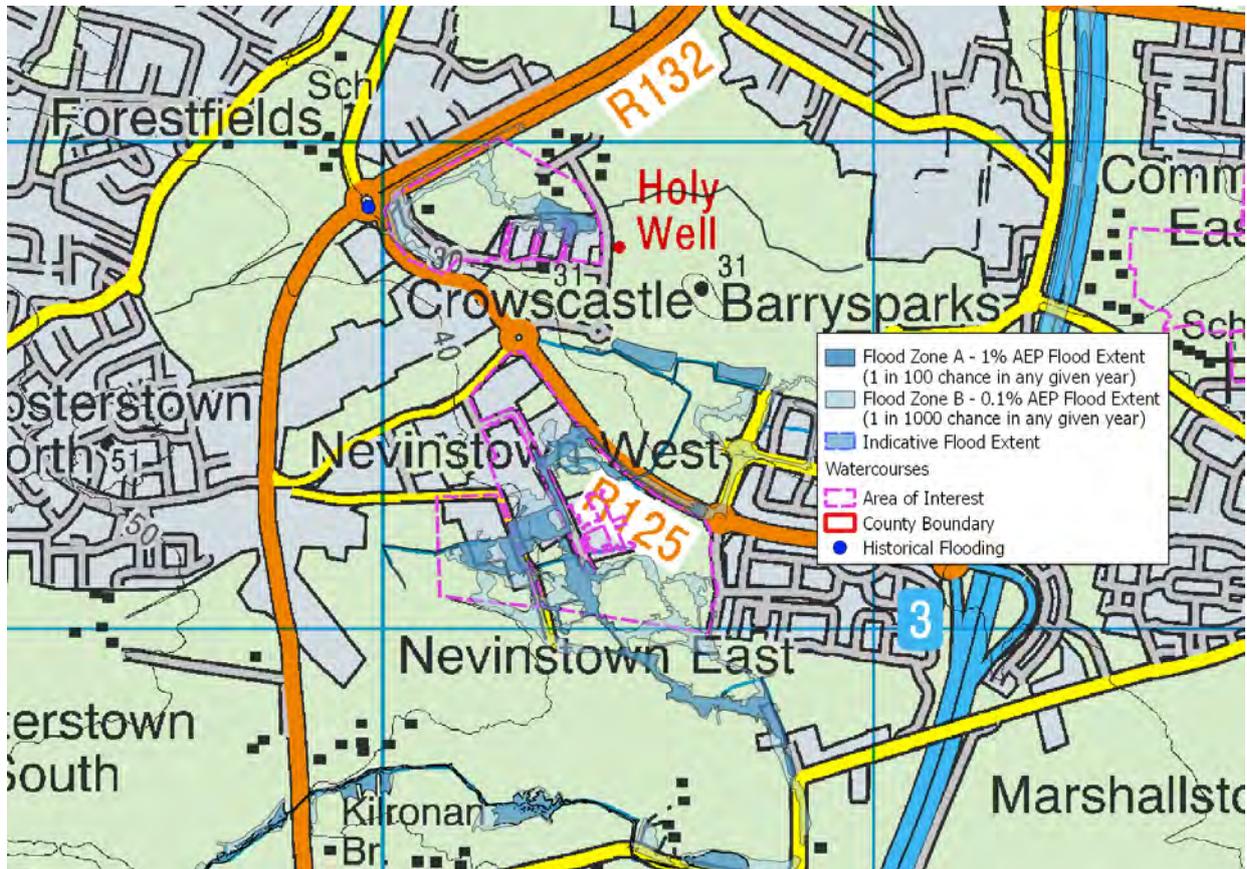


Figure 6.21 Airside

### 6.1.22 Swords

Some lands in the Swords town centre overlap with Flood Zones A and B. The flood extents are largely confined to car parking areas and public spaces adjacent to the Ward River. Any future expansion of the industrial / commercial development lands in the town centre must be reviewed in terms of flood risk and an appropriately detailed FRA submitted with any planning application. Highly vulnerable development should be avoided in the Flood Zones A and B with development subject to a detailed FRA where appropriate.

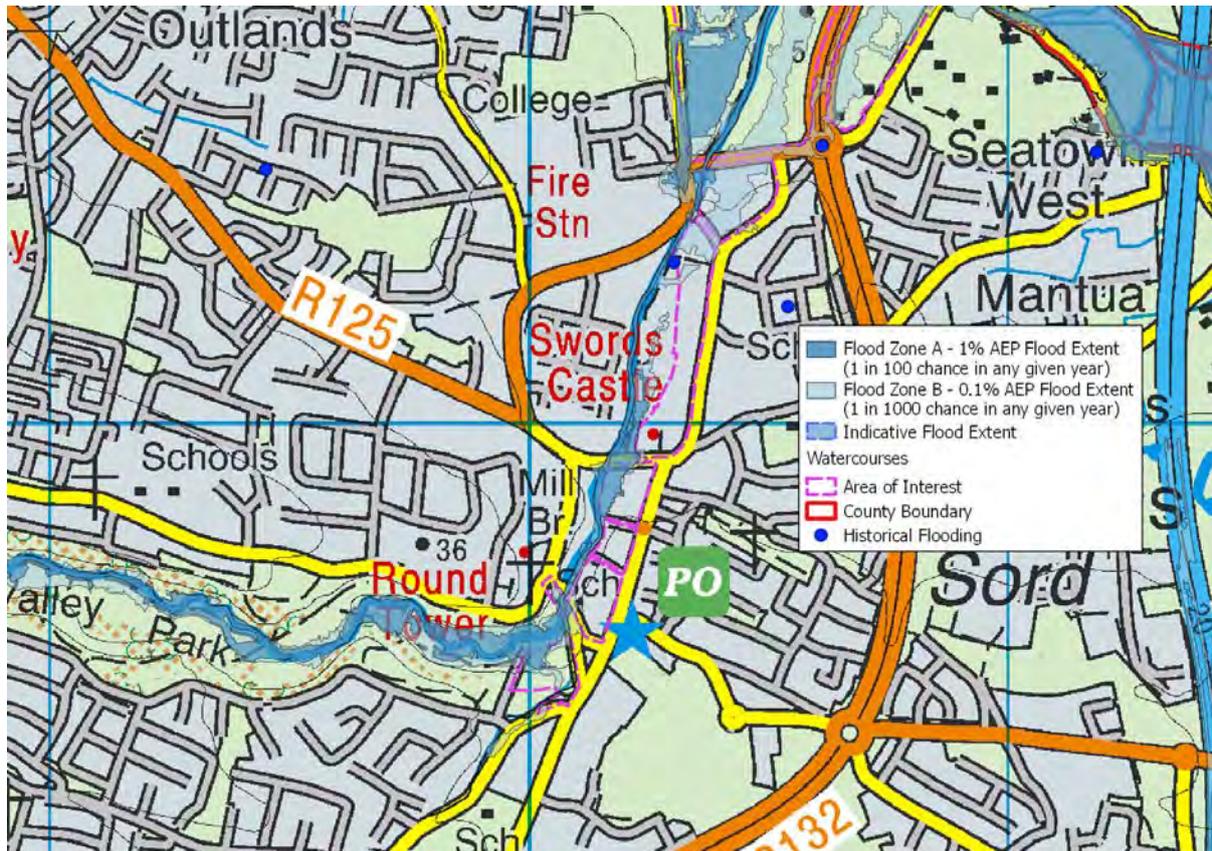


Figure 6.22 Swords

### 6.1.23 Coolquay

Lands in Coolquay overlap with a large Flood Zone B extent. FCC has rezoned this land from rural to rural cluster. It was recommended that the land should not be rezoned due to the flood extent as the rural cluster zoning allows for highly vulnerable development. FCC passed a Justification Test which is included in Appendix B, requiring that a site specific FRA be undertaken as a condition for development on the site.



Figure 6.23 Coolquay

### 6.1.24 Ballough

Lands at Ballough have been rezoned from rural to rural cluster. It was recommended that the land should not be rezoned without first identifying the flood risk in the area more accurately, as the only available flood zone information for the area is PFRA mapping. The watercourses in this area were outside the scope of the FEM FRAM flood zone mapping. The OPW PFRA mapping provides an indication that there may be a flood risk to the lands adjacent to the local watercourse. FCC passed a Justification Test which is included in Appendix B, requiring that a site specific FRA be undertaken as a condition for development on the site.

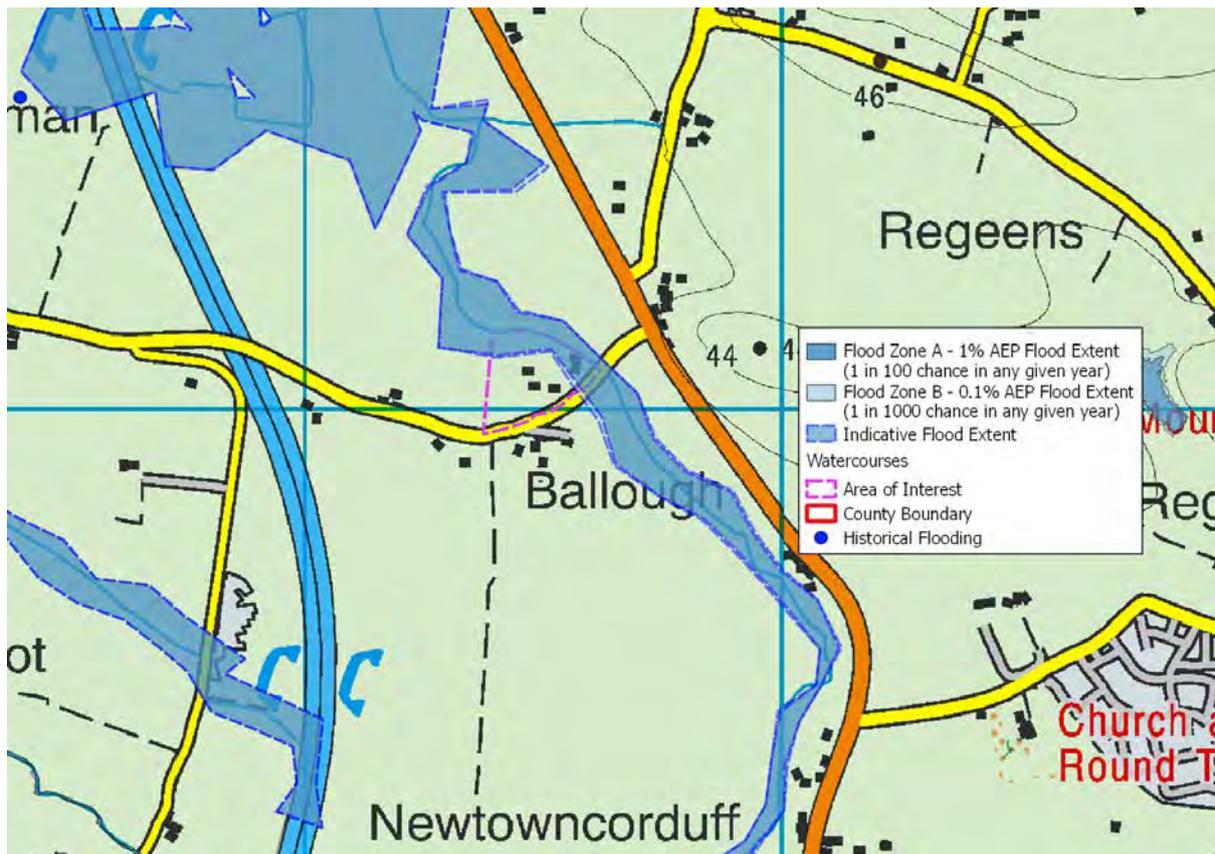


Figure 6.24 Ballough

### 6.1.25 Individual Risk Receptors

The FEM FRAM study identified individual risk receptors (IRRs) which are an individual asset of particular economic or social value that has been identified as being prone to flooding and hence represents a significant risk in its own right, such as transport and utilities infrastructure. These may require specific consideration during the development of the flood risk management options. **Table 6.7** outlines the preferred flood risk management options identified for the individual risk receptors in the FEM FRAM study for Fingal. Any potential works are subject to discussion with the asset owner.

**Table 6.2 FEM FRAM options for IRRs**

Objective ID No.	Objective Description
Utility asset at Stamullin	Construction of localised flood defence embankments or IPFP
WWTW at Ballyboghil	Construction of localised flood defence embankments
M1 at Staffordstown	Construction of localised flood defence embankments
WWTWs at Toberburr	Construction of localised flood defence embankments
N32 at Clonshaugh	Construction of localised flood defence embankments

Flooding along the N3 adjacent to the Tolka River has been addressed during the completion of the Tolka Flooding Study recommended works. A review of the CFRAM flood extents also shows flooding from the Santry River affecting M50 motorway for the 0.1% AEP flood event.

### 6.1.26 Zoning Flood Risk Summary and Proposals

**Table 6.8** outlines the SFRA proposals and the planning decisions undertaken to address flood risk in the identified areas. Development Plan Justification Tests are shown in Appendix B.

**Table 6.3 SFRA proposals and the planning decisions undertaken to address flood risk in the identified areas**

Zoned Lands	SFRA Recommendations	FCC Decision
Courtclough	<p>Carry out Justification Test (JT) for less vulnerable development in Flood Zone A for lands at southern end of the zoned lands.</p> <p>If JT Fails carry out some or all of the following; Remove zoning, 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.</p> <p>If JT Passes demonstrate 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.</p>	<p>The current land zoning objective is to be maintained. A Justification Test was carried out and passed by FCC. Specific Flood Risk Assessment was carried out. In line with Objective SW07, a site-specific Flood Risk Assessment to an appropriate level of detail, addressing all potential sources of flood risk, is required, demonstrating compliance with the <i>Planning System and Flood Risk Management-Guidelines for Planning Authorities (DoEHLG/OPW 2009)</i> or any updated version of these guidelines.</p>
Ballymadun	<p>It is recommended that the lands adjacent to the Hurley River be subject a Stage 2 FRA to identify more accurately the flood risk in the area before any development or zoning is considered for this site. Highly vulnerable development should be avoided in the Flood Zones A and B with less vulnerable development subject to a detailed FRA in Flood Zone A. The FRA should address surface water and drainage, mitigation measures, residual risk and appropriate land use with respect to vulnerability of the proposed development type.</p>	<p>The current land zoning objective is to be maintained. A Justification Test was carried out and passed by FCC. Specific Flood Risk Assessment was carried out. In line with Objective SW07, a site-specific Flood Risk Assessment to an appropriate level of detail, addressing all potential sources of flood risk, is required, demonstrating compliance with the <i>Planning System and Flood Risk Management-Guidelines for Planning Authorities (DoEHLG/OPW 2009)</i> or any updated version of these guidelines.</p>
Rolestown	<p>Highly vulnerable development should be avoided in the Flood Zones A and B with less vulnerable development subject to a detailed FRA in Flood Zone A. The FRA should address surface water and drainage, mitigation measures, residual risk and appropriate land use with respect to vulnerability of the proposed development type.</p>	<p>The current land zoning objective is to be maintained. A Justification Test was carried out and passed by FCC. Specific Flood Risk Assessment was carried out. In line with Objective SW07, a site-specific Flood Risk Assessment to an appropriate level of detail, addressing all potential sources of flood risk, is required, demonstrating compliance with the <i>Planning System and Flood Risk Management-Guidelines for Planning</i></p>

Zoned Lands	SFRA Recommendations	FCC Decision
	Justification Test would not apply to minor development to existing buildings in this area however, a flood risk assessment of appropriate detail should accompany such applications to demonstrate that they would not have adverse flood risk impacts.	<i>Authorities (DoEHLG/OPW 2009)</i> or any updated version of these guidelines.
Ballyboughal	Site Specific FRAs should be carried out to address flood risk, propose mitigation measures and assign appropriate land uses.  Justification Test would not apply to minor development to existing buildings in this area however, a flood risk assessment of appropriate detail should accompany such applications to demonstrate that they would not have adverse flood risk impacts.	The current land zoning objective is to be maintained. A Justification Test was carried out and passed by FCC. Specific Flood Risk Assessment was carried out. In line with Objective SW07, a site-specific Flood Risk Assessment to an appropriate level of detail, addressing all potential sources of flood risk, is required, demonstrating compliance with the <i>Planning System and Flood Risk Management-Guidelines for Planning Authorities (DoEHLG/OPW 2009)</i> or any updated version of these guidelines.
Coolatrath	Highly vulnerable development should be avoided in the Flood Zones A and B with less vulnerable development subject to a detailed FRA in Flood Zone A. The FRA should address surface water and drainage, mitigation measures, residual risk and appropriate land use with respect to vulnerability of the proposed development type.	The current land zoning objective is to be maintained. A Justification Test was carried out and passed by FCC. Specific Flood Risk Assessment was carried out. In line with Objective SW07, a site-specific Flood Risk Assessment to an appropriate level of detail, addressing all potential sources of flood risk, is required, demonstrating compliance with the <i>Planning System and Flood Risk Management-Guidelines for Planning Authorities (DoEHLG/OPW 2009)</i> or any updated version of these guidelines.
Skerries	Carry out Justification Test (JT) for vulnerable development in Flood Zone A If JT Fails carry out some or all of the following; Remove zoning, 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 JT Passes demonstrate 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.	The current land zoning objectives are to be maintained. A Justification Test was carried out and passed by FCC. Specific Flood Risk Assessment was carried out. In line with Objective SW07, a site-specific Flood Risk Assessment to an appropriate level of detail, addressing all potential sources of flood risk, is required, demonstrating compliance with the <i>Planning System and Flood Risk Management-Guidelines for Planning Authorities (DoEHLG/OPW 2009)</i> or any updated version of these guidelines.

Zoned Lands	SFRA Recommendations	FCC Decision
Rush	Highly vulnerable development should be avoided in the Flood Zones A and B with less vulnerable development subject to a detailed FRA in Flood Zone A. The FRA should address surface water and drainage, mitigation measures, residual risk and appropriate land use with respect to vulnerability of the proposed development type.	The current land zoning objective is to be maintained. A Justification Test was carried out and passed by FCC. Specific Flood Risk Assessment was carried out. In line with Objective SW07, a site-specific Flood Risk Assessment to an appropriate level of detail, addressing all potential sources of flood risk, is required, demonstrating compliance with the <i>Planning System and Flood Risk Management-Guidelines for Planning Authorities (DoEHLG/OPW 2009)</i> or any updated version of these guidelines.
Blakescross, Lusk	Carry out Justification Test (JT) for vulnerable development in Flood Zone A If JT Fails carry out some or all of the following; Remove zoning, 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 JT Passes demonstrate 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.	The current land zoning objective is to be maintained. A Justification Test was carried out and passed by FCC. Specific Flood Risk Assessment was carried out. In line with Objective SW07, a site-specific Flood Risk Assessment to an appropriate level of detail, addressing all potential sources of flood risk, is required, demonstrating compliance with the <i>Planning System and Flood Risk Management-Guidelines for Planning Authorities (DoEHLG/OPW 2009)</i> or any updated version of these guidelines.
Lanestown / Turvey	Highly vulnerable development should be avoided in the Flood Zones A and B with less vulnerable development subject to a detailed FRA in Flood Zone A. The FRA should address surface water and drainage, mitigation measures, residual risk and appropriate land use with respect to vulnerability of the proposed development type.	The current land zoning objective is to be maintained. A Justification Test was carried out and passed by FCC. Specific Flood Risk Assessment was carried out. Further FRA will be completed as part of a Masterplan for the area. In line with Objective SW07, a site-specific Flood Risk Assessment to an appropriate level of detail, addressing all potential sources of flood risk, is required, demonstrating compliance with the <i>Planning System and Flood Risk Management-Guidelines for Planning Authorities (DoEHLG/OPW 2009)</i> or any updated version of these guidelines.
Burrow, Portrane	Site Specific FRAs should be carried out to address flood risk, propose mitigation measures and assign appropriate land uses.	The current land zoning objective is to be maintained. A Justification Test was carried out and passed by FCC. Further flood risk assessment will also take place as part of the Urban Framework Plan process. Specific Flood Risk Assessment was carried out. In line with Objective SW07, a site-specific Flood Risk Assessment to an appropriate level of

Zoned Lands	SFRA Recommendations	FCC Decision
		detail, addressing all potential sources of flood risk, is required, demonstrating compliance with the <i>Planning System and Flood Risk Management-Guidelines for Planning Authorities (DoEHLG/OPW 2009)</i> or any updated version of these guidelines.
Lissenhall	Assign Land Zonings in accordance with the Guidelines recommendations avoiding vulnerable development in flood risk areas using the SFRA flood zones.	The current land zoning objective is to be maintained. A Justification Test was carried out and passed by FCC. The current land zoning adjacent will be subject to a further detailed FRA during the development of a LAP for Lissenhall to assign an appropriate land use. Specific Flood Risk Assessment was carried out. In line with Objective SW07, a site-specific Flood Risk Assessment to an appropriate level of detail, addressing all potential sources of flood risk, is required, demonstrating compliance with the <i>Planning System and Flood Risk Management-Guidelines for Planning Authorities (DoEHLG/OPW 2009)</i> or any updated version of these guidelines.
Balheary	Highly vulnerable development should be avoided in the Flood Zones A and B with less vulnerable development subject to a detailed FRA in Flood Zone A. The FRA should address surface water and drainage, mitigation measures, residual risk and appropriate land use with respect to vulnerability of the proposed development type.	The current land zoning objective is to be maintained. A Justification Test was carried out and passed by FCC. Specific Flood Risk Assessment was carried out. Further FRA will be completed as part of a Masterplan for the area. In line with Objective SW07, a site-specific Flood Risk Assessment to an appropriate level of detail, addressing all potential sources of flood risk, is required, demonstrating compliance with the <i>Planning System and Flood Risk Management-Guidelines for Planning Authorities (DoEHLG/OPW 2009)</i> or any updated version of these guidelines.
Malahide	Highly vulnerable development should be avoided in the Flood Zones A and B with less vulnerable development subject to a detailed FRA in Flood Zone A. The FRA should address surface water and drainage, mitigation measures, residual risk and appropriate land use with respect to vulnerability of the proposed development type.	The current land zoning objective is to be maintained. A Justification Test was carried out and passed by FCC. Specific Flood Risk Assessment was carried out. In line with Objective SW07, a site-specific Flood Risk Assessment to an appropriate level of detail, addressing all potential sources of flood risk, is required, demonstrating compliance with the <i>Planning System and Flood Risk Management-Guidelines for Planning Authorities (DoEHLG/OPW 2009)</i> or any updated version of these guidelines.

Zoned Lands	SFRA Recommendations	FCC Decision
Streamstown, Malahide	<p>Carry out Justification Test (JT) for vulnerable development in Flood Zone A</p> <p>If JT Fails carry out some or all of the following; Remove zoning, 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.</p> <p>If JT Passes demonstrate 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.</p>	<p>The Current land zoning objective is to be maintained. A Justification Test was carried out and passed by FCC. Specific Flood Risk Assessment was carried out. In line with Objective SW07, a site-specific Flood Risk Assessment to an appropriate level of detail, addressing all potential sources of flood risk, is required, demonstrating compliance with the <i>Planning System and Flood Risk Management-Guidelines for Planning Authorities (DoEHLG/OPW 2009)</i> or any updated version of these guidelines.</p>
Balgriffin	<p>Carry out Justification Test (JT) for vulnerable development in Flood Zone A</p> <p>If JT Fails carry out some or all of the following; Remove zoning, 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.</p> <p>If JT Passes demonstrate 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.</p>	<p>The current land zoning objective is to be maintained. A Justification Test was carried out and passed by FCC. Specific Flood Risk Assessment was carried out. In line with Objective SW07, a site-specific Flood Risk Assessment to an appropriate level of detail, addressing all potential sources of flood risk, is required, demonstrating compliance with the <i>Planning System and Flood Risk Management-Guidelines for Planning Authorities (DoEHLG/OPW 2009)</i> or any updated version of these guidelines.</p>
Howth / Baldoyle / Sutton	<p>Site Specific FRAs should be carried out to address flood risk. The FRA should address surface water and drainage, mitigation measures, residual risk and appropriate land use with respect to vulnerability of the proposed development type.</p>	<p>The current land zoning objective is to be maintained. A Justification Test was carried out and passed by FCC. Specific Flood Risk Assessment was carried out. In line with Objective SW07, a site-specific Flood Risk Assessment to an appropriate level of detail, addressing all potential sources of flood risk, is required, demonstrating compliance with the <i>Planning System and Flood Risk Management-Guidelines for Planning Authorities (DoEHLG/OPW 2009)</i> or any updated version of these guidelines.</p>

Zoned Lands	SFRA Recommendations	FCC Decision
Damastown, Macetown & Clonee	<p>Site Specific FRAs should be carried out to address flood risk, propose mitigation measures and assign appropriate land uses.</p> <p>Any future expansion of existing development must be reviewed in terms of flood risk and an appropriately detailed FRA submitted with any planning application</p>	<p>The current land zoning objective is to be maintained. A Justification Test was carried out and passed by FCC. Specific Flood Risk Assessment was carried out. In line with Objective SW07, a site-specific Flood Risk Assessment to an appropriate level of detail, addressing all potential sources of flood risk, is required, demonstrating compliance with the <i>Planning System and Flood Risk Management-Guidelines for Planning Authorities (DoEHLG/OPW 2009)</i> or any updated version of these guidelines.</p>
Mulhuddart	<p>Site Specific FRAs should be carried out to address flood risk, propose mitigation measures and assign appropriate land uses.</p> <p>Any future expansion of existing development must be reviewed in terms of flood risk and an appropriately detailed FRA submitted with any planning application</p>	<p>The current land zoning objective is to be maintained. A Justification Test was carried out and passed by FCC. Specific Flood Risk Assessment was carried out. In line with Objective SW07, a site-specific Flood Risk Assessment to an appropriate level of detail, addressing all potential sources of flood risk, is required, demonstrating compliance with the <i>Planning System and Flood Risk Management-Guidelines for Planning Authorities (DoEHLG/OPW 2009)</i> or any updated version of these guidelines.</p>
Balbriggan	<p>Site Specific FRAs should be carried out to address flood risk, propose mitigation measures and assign appropriate land uses.</p> <p>Any future expansion of existing development must be reviewed in terms of flood risk and an appropriately detailed FRA submitted with any planning application</p>	<p>The current land zoning objectives are to be maintained. A Justification Test was carried out and passed by FCC. Specific Flood Risk Assessment was carried out. In line with Objective SW07, a site-specific Flood Risk Assessment to an appropriate level of detail, addressing all potential sources of flood risk, is required, demonstrating compliance with the <i>Planning System and Flood Risk Management-Guidelines for Planning Authorities (DoEHLG/OPW 2009)</i> or any updated version of these guidelines.</p>
Santry Close	<p>Site Specific FRAs should be carried out to address flood risk, propose mitigation measures and assign appropriate land uses.</p> <p>Any future expansion of existing development must be reviewed in terms of flood risk and an appropriately detailed FRA submitted with any planning application</p>	<p>The current land zoning objective is to be maintained. A Justification Test was carried out and passed by FCC. Specific Flood Risk Assessment was carried out. In line with Objective SW07, a site-specific Flood Risk Assessment to an appropriate level of detail, addressing all potential sources of flood risk, is required, demonstrating compliance with the <i>Planning System and Flood Risk Management-Guidelines for Planning Authorities (DoEHLG/OPW 2009)</i> or any updated version of these guidelines.</p>

Zoned Lands	SFRA Recommendations	FCC Decision
Airside	<p>Site Specific FRAs should be carried out to address flood risk, propose mitigation measures and assign appropriate land uses.</p> <p>Any future expansion of existing development must be reviewed in terms of flood risk and an appropriately detailed FRA submitted with any planning application</p>	<p>The current land zoning objective is to be maintained. A Justification Test was carried out and passed by FCC. Specific Flood Risk Assessment was carried out. In line with Objective SW07, a site-specific Flood Risk Assessment to an appropriate level of detail, addressing all potential sources of flood risk, is required, demonstrating compliance with the <i>Planning System and Flood Risk Management-Guidelines for Planning Authorities (DoEHLG/OPW 2009)</i> or any updated version of these guidelines.</p>
Swords	<p>Site Specific FRAs should be carried out to address flood risk, propose mitigation measures and assign appropriate land uses.</p> <p>Any future expansion of existing development must be reviewed in terms of flood risk and an appropriately detailed FRA submitted with any planning application</p>	<p>The current land zoning objective is to be maintained. A Justification Test was carried out and passed by FCC. Specific Flood Risk Assessment was carried out. In line with Objective SW07, a site-specific Flood Risk Assessment to an appropriate level of detail, addressing all potential sources of flood risk, is required, demonstrating compliance with the <i>Planning System and Flood Risk Management-Guidelines for Planning Authorities (DoEHLG/OPW 2009)</i> or any updated version of these guidelines.</p>
Coolquay	<p>Lands in Coolquay overlap with a large Flood Zone B extent. FCC has rezoned this land from rural to rural cluster. It was recommended that the land should not be rezoned due to the flood extent as the rural cluster zoning allows for highly vulnerable development.</p>	<p>The current land zoning objective is to be changed. A Justification Test was carried out and passed by FCC. Specific Flood Risk Assessment was carried out. In line with Objective SW07, a site-specific Flood Risk Assessment to an appropriate level of detail, addressing all potential sources of flood risk, is required, demonstrating compliance with the <i>Planning System and Flood Risk Management-Guidelines for Planning Authorities (DoEHLG/OPW 2009)</i> or any updated version of these guidelines.</p>
Ballough	<p>Lands at Ballough have been rezoned from rural to rural cluster. It was recommended that the land should not be rezoned without first identifying more accurately the flood risk in the area as the only available flood zone information for the area is PFRA mapping. The watercourses in this area were outside the scope of the FEM FRAM flood zone mapping. The OPW PFRA mapping provides an indication that there may be a flood risk to the lands adjacent to the local watercourse.</p>	<p>The current land zoning objective is to be changed. A Justification Test was carried out and passed by FCC. Specific Flood Risk Assessment was carried out. In line with Objective SW07, a site-specific Flood Risk Assessment to an appropriate level of detail, addressing all potential sources of flood risk, is required, demonstrating compliance with the <i>Planning System and Flood Risk Management-Guidelines for Planning Authorities (DoEHLG/OPW 2009)</i> or any updated version of these guidelines.</p>

## 7 FLOOD RISK MANAGEMENT POLICIES AND OBJECTIVES

### 7.1 GENERAL DEVELOPMENT PLANS AND STRATEGIES

The County Development Plan outlines surface water and flooding flood risk management policies which have been strengthened and improved upon since the previous Development Plan. These have also been updated based on the information provided in the SFRA process and are shown in Table 7.1.

**Table 7.1 Existing Flood Risk Management Policies**

Objective ID No.	Objective Description
SW01	Protect and enhance the County's floodplains, wetlands and coastal areas subject to flooding as vital green infrastructure which provides space for storage and conveyance of floodwater, enabling flood risk to be more effectively managed and reducing the need to provide flood defences in the future.
SW02	Allow no new development within floodplains other than development which satisfies the justification test, as outlined in the Planning System and Flood Risk Management Guidelines 2009 for Planning Authorities (or any updated guidelines).
SW03	Identify existing surface water drainage systems vulnerable to flooding and develop proposals to alleviate flooding in the areas served by these systems.
SW04	Require the use of sustainable drainage systems (SuDS) to minimise and limit the extent of hard surfacing and paving and require the use of sustainable drainage techniques for new development or for extensions to existing developments.
SW05	Discourage the use of hard non porous surfacing and pavements within the boundaries of rural housing sites.
SW06	Encourage the use of Green Roofs on apartment, commercial, leisure and educational buildings
SW07	Implement the Planning System and Flood Risk Management-Guidelines for Planning Authorities (DoEHLG/OPW 2009) or any updated version of these guidelines. For lands identified in the SFRA, located in the following areas: Courtlough; Ballymadun; Rolestown; Ballyboughal; Coolatrath; Milverton, Skerries; Channell Road, Rush; Blakescross; Lanestown/Turvey; Lissenhall, Swords; Balheary, Swords; Village/Marina Area, Malahide; Streamstown, Malahide; Balgriffin; Damastown, Macetown and Clonee, Blanchardstown; Mulhuddart, Blanchardstown; Portrane; Sutton and Howth; a site-specific Flood Risk Assessment to an appropriate level of detail, addressing all potential sources of flood risk, is required, demonstrating compliance with the aforementioned Guidelines or any updated version of these guidelines, paying particular attention to residual flood risks and any proposed site specific flood management measures.
SW08	Implement the recommendations of the Fingal East Meath Flood Risk Assessment and Management Study (FEM FRAMS) when completed.
SW09	Assess and implement the recommendations of the Eastern CFRAMS when complete.
SW10	Require the provision of regional stormwater control facilities for all Local Area Plan lands and Strategic Development Zones with a view to also incorporating these control facilities in currently developed catchments prone to flooding.
SW11	Ensure that where flood protection or alleviation works takes place that the natural and cultural heritage and rivers, streams and watercourses are protected and enhanced to the greatest extent possible.
SW12	Require an environmental assessment of all proposed flood protection or alleviation works.
SW13	Provide for the schemes listed in Table SW01: Table SW01: Surface Water Schemes 1. Implementation of Fingal East Meath Flood Risk Assessment and

		Management Study (FEM-FRAMS), Measures – Flood Mitigation	
		2. Implementation of CFRAMS : Eastern CFRAMS Measures	
		3. Early Flood Warning System	
		4. Donabate Surface Water System	
		5. Garristown Surface Water System	

## 7.2 FLOOD RISK MANAGEMENT PLANS

The Eastern CFRAM FRMP is ongoing (due for completion in late 2017). If deemed necessary, flood risk management objectives, options, plans and any recommendation from the FRMPs should be supported in future development plans. Section 5.3.4 outlines some of the draft flood risk management proposals for the Eastern CFRAM Study Area relevant to Fingal. The Eastern CFRAM FRMP has adopted the flood risk management proposals of the previous Tolka River Flood Study and the FEM FRAM Study. FCC has committed to implement the CFRAM proposals in conjunction with the OPW.

## 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 the County to assist FCC to make informed strategic land-use planning decisions. The flood risk information has enabled FCC 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

Fingal 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 the water cannot discharge due to a high water level in the receiving watercourse.
- Coastal flooding - Caused by high sea levels resulting in the sea overflowing onto the land

These types of flood risk act independently or in combination to cause flooding across the county.

The flood zones extents have been prepared in accordance with the Planning System and Flood Risk Assessment Guidelines, identifying Flood Zones A, B and C. The flood zone maps are largely derived from the Eastern CFRAM, FEM FRAM and the Tolka Flooding Study mapping. These maps are the most comprehensive flood maps produced for Fingal since the introduction of the Guidelines and the Floods Directive. Flood extents for areas that are outside of the scope of the three flood studies are supplemented by fluvial mapping from the earlier OPW Preliminary Flood Risk Assessment (PFRA) Report. The Flood Zone mapping is based on the best currently available data and a more detailed, site specific FRA may generate localised flood extents. Future updates to mapping in areas subject to ongoing assessment (as noted in section 5.6) will be reviewed and adopted into future County Development Plan SFRAs. The flood zones only account for inland flooding and coastal 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

The existing County Development Plan flood risk management policies have been retained and amended as appropriate. The council has committed to the requirement that SuDS are to be utilised and encouraged to improve surface water drainage. They will also manage flood risk in the County in accordance with the requirements of the Planning System and Flood Risk Management Guidelines for Planning Authorities - DECLG and OPW (2009) and circular PL02/2014 (August 2014), in particular when preparing plans and programmes and assessing development proposals. All development

proposals within flood risk areas 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 areas that meet the Development Plan Justification Test criteria, a Development Management Justification Test must then be applied.

The council has committed to supporting and co-operating with the Office of Public Works (OPW) in delivering the Eastern Catchment Based Flood Risk Assessment and Management Study (CFRAMS) and associated Flood Management Plan (FRMP). The recommendations and outputs arising from this study shall be considered in preparing plans and assessing development proposals. It will also continue to implement the recommendations of the Fingal East Meath Flood Risk Assessment and Management Study (FEMFRAMS).

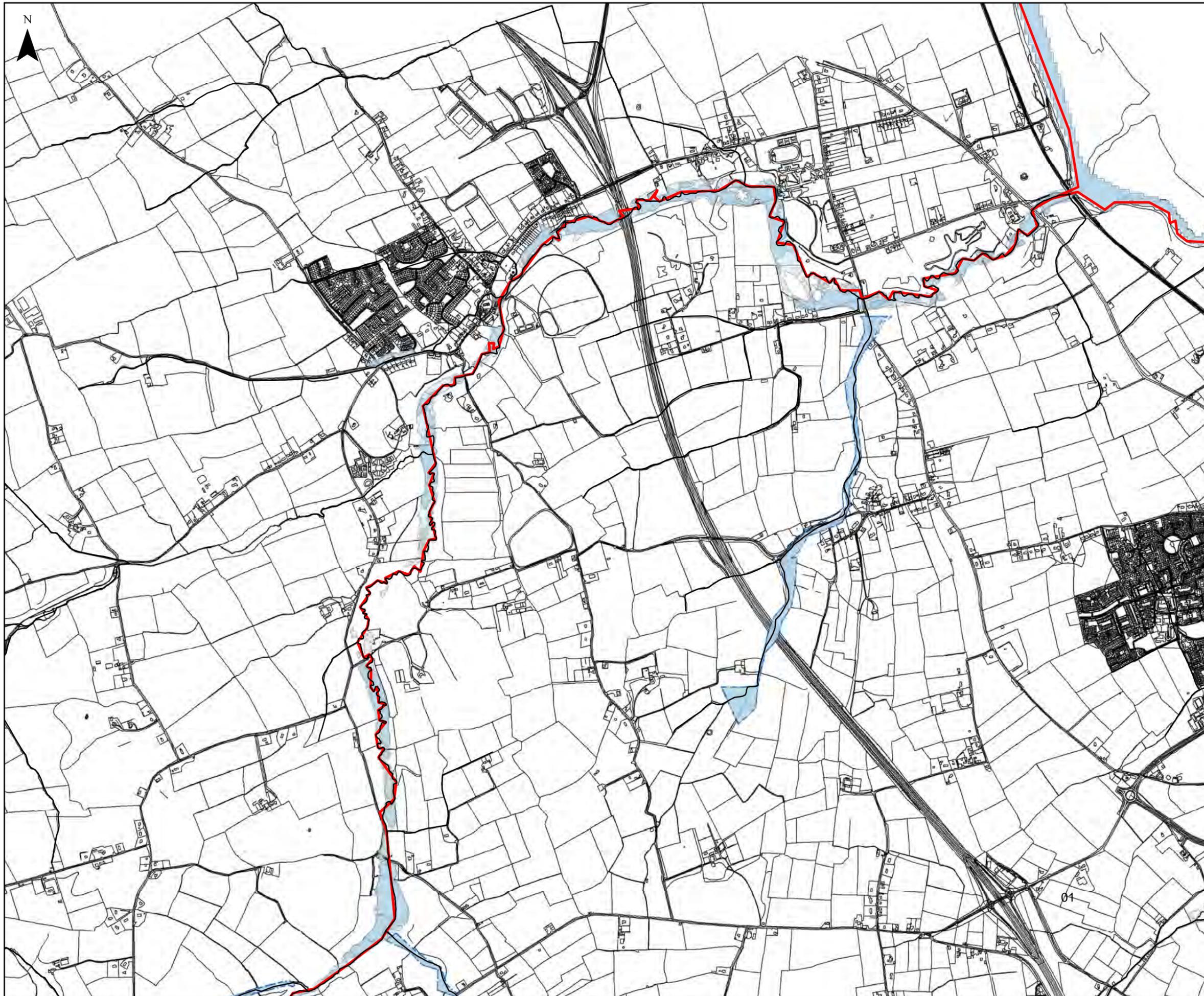
## **8.4 SFRA REVIEW AND MONITORING**

The Fingal SFRA will be reviewed and updated every six years in line with the County Development Plan review process. Additionally, outputs from future studies and datasets may trigger a review and update of the SFRA during the lifetime of the 2017-2023 Development Plan. These include the outputs from the ECFRAM FRMP and the reviews of the flood zone mapping in some areas. 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 County SFRA's.



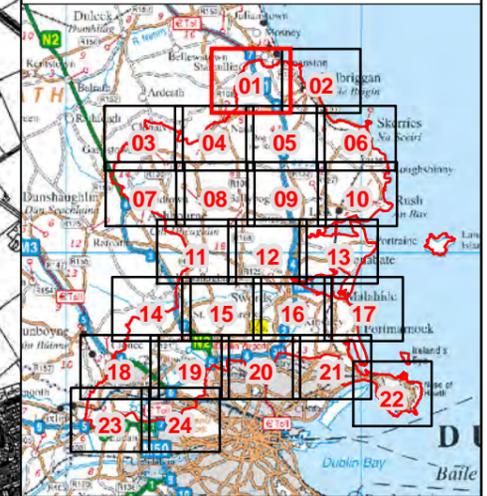
**APPENDIX A**  
**FLUVIAL FLOOD ZONE MAPPING**





### Legend

- Watercourses
- ▭ Fingal County Boundary
- ▨ Defended Area
- ▭ Flood Zone A - 1% AEP (Fluvial) or 0.5% AEP (Coastal) 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)
- ▭ Indicative Flood Extents



Client



Project

**Strategic Flood Risk Assessment**

Title

**Flood Zone Mapping**

Figure

**Map 01 of 24**



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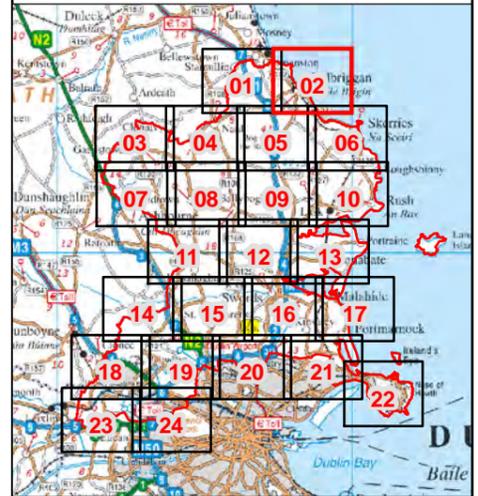
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### Legend

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- Indicative Flood Extents



Client

**Comhairle Contae Fhine Gall**  
Fingal County Council

Project  
**Strategic Flood Risk Assessment**

Title  
**Flood Zone Mapping**

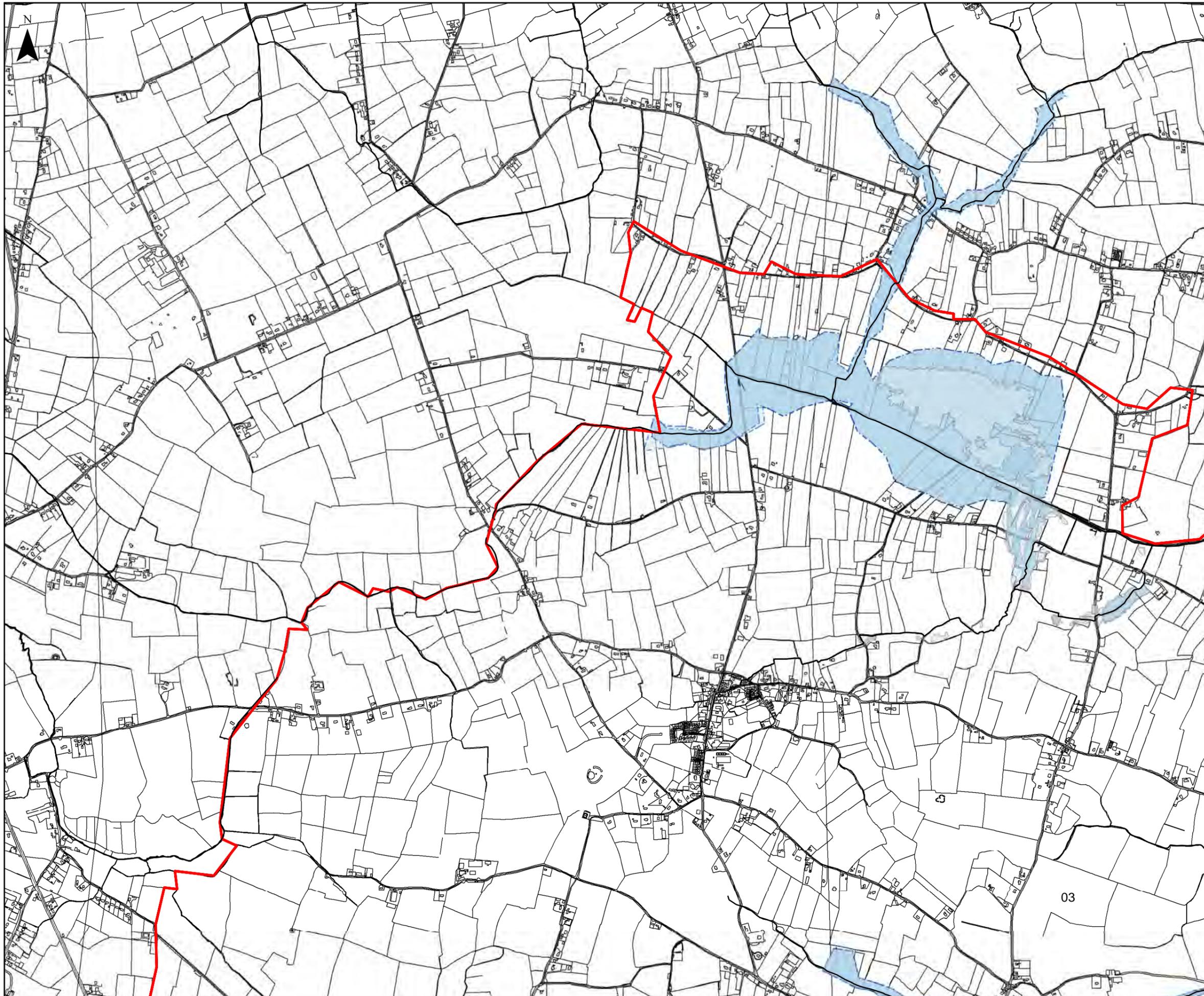
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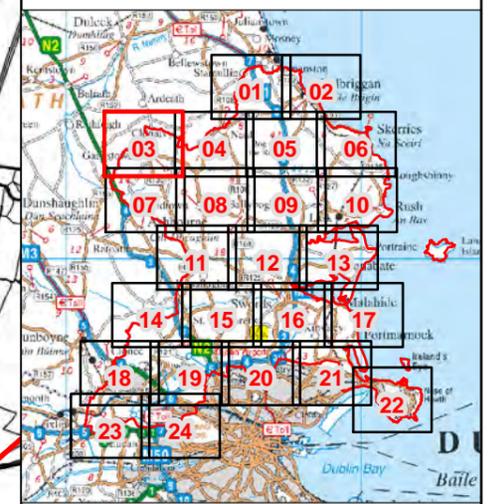
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**Client**



**Comhairle Contae Fhine Gall**  
Fingal County Council

**Project**  
**Strategic Flood Risk Assessment**

**Title**  
**Flood Zone Mapping**

**Figure**  
**Map 03 of 24**

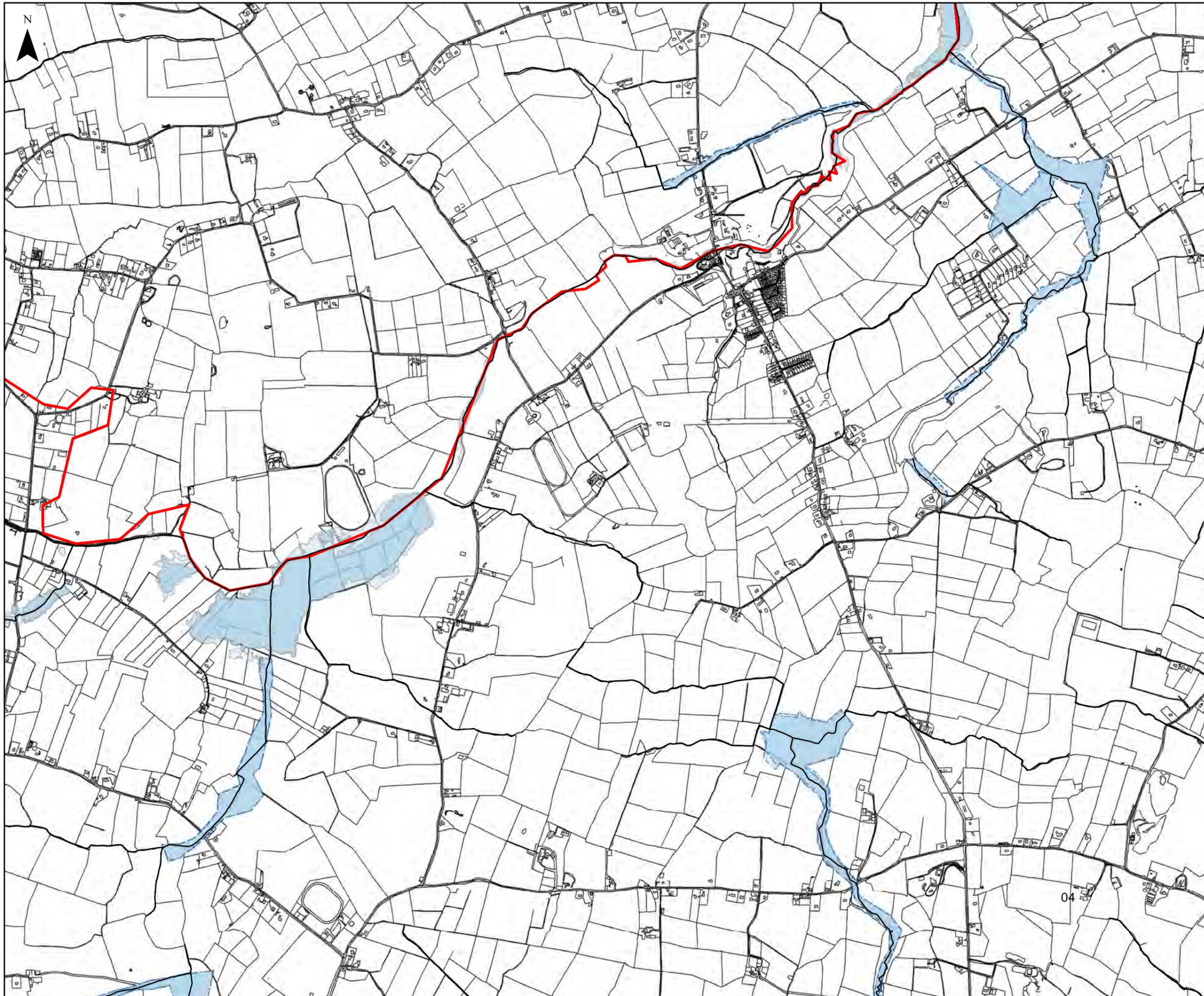


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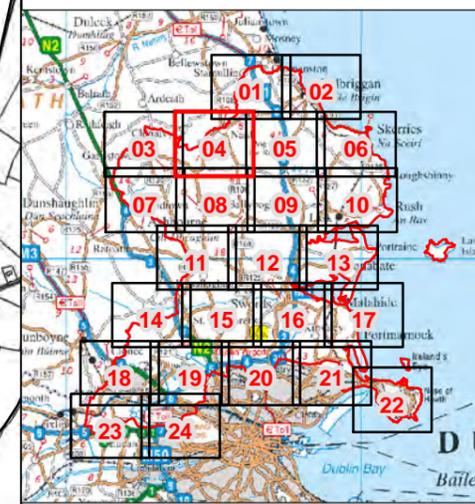
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Client



**Comhairle Contae Fhine Gall**  
Fingal County Council

Project  
**Strategic Flood Risk Assessment**

Title  
**Flood Zone Mapping**

Figure  
**Map 04 of 24**

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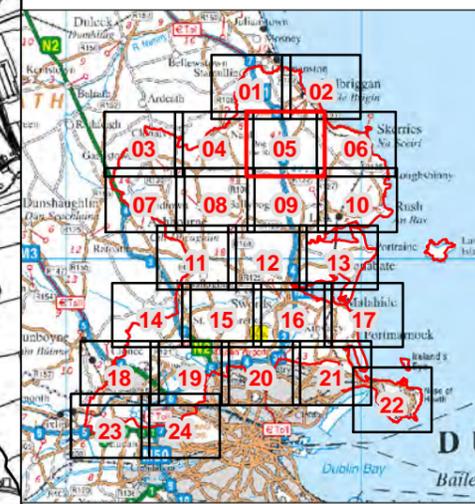
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Client



Project

**Strategic Flood Risk Assessment**

Title

**Flood Zone Mapping**

Figure

**Map 05 of 24**



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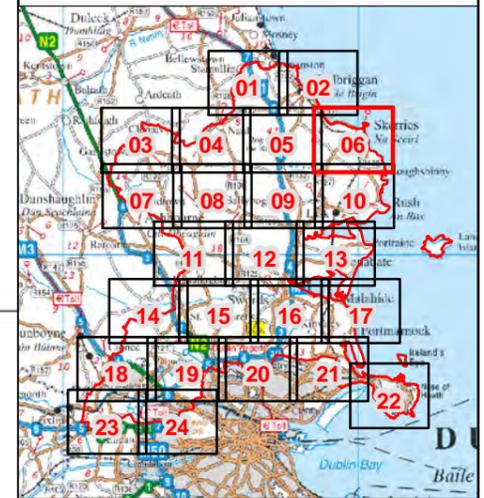
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Client



Project

**Strategic Flood Risk Assessment**

Title

**Flood Zone Mapping**

Figure

**Map 06 of 24**



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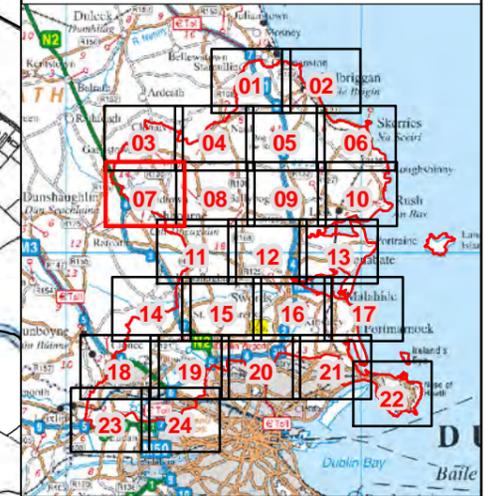
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Client



Project

**Strategic Flood Risk Assessment**

Title

**Flood Zone Mapping**

Figure

**Map 07 of 24**



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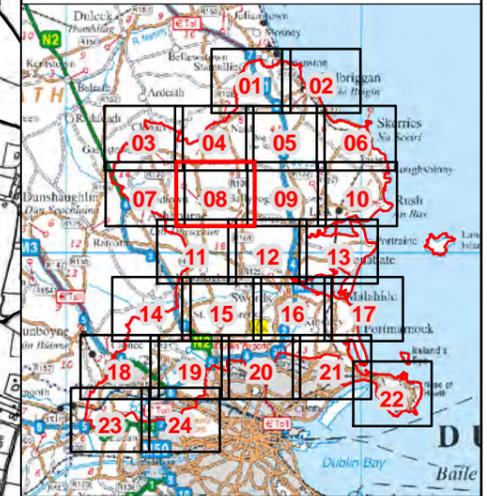
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-  Fingal County Boundary
-  Defended Area
-  Flood Zone A - 1% AEP (Fluvial) or 0.5% AEP (Coastal) Flood Extent (1 in 100 chance in any given year)
-  Flood Zone B - 0.1% AEP Flood Extent (1 in 1000 chance in any given year)
-  Indicative Flood Extents



Client



Project

**Strategic Flood Risk Assessment**

Title

**Flood Zone Mapping**

Figure

**Map 08 of 24**



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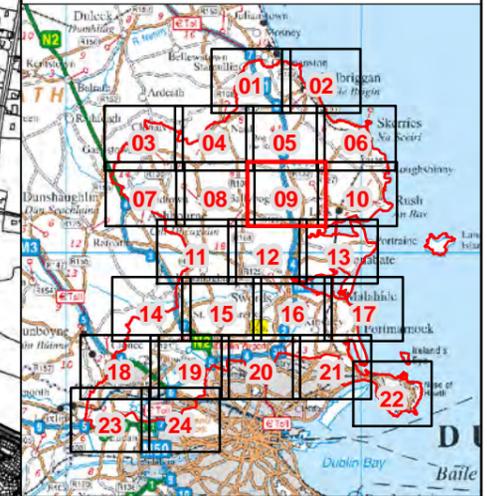
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### Legend

- Watercourses
- Fingal County Boundary
- ▨ Defended Area
- Flood Zone A - 1% AEP (Fluvial) or 0.5% AEP (Coastal) 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)
- Indicative Flood Extents



Client



Project

**Strategic Flood Risk Assessment**

Title

**Flood Zone Mapping**

Figure

**Map 09 of 24**



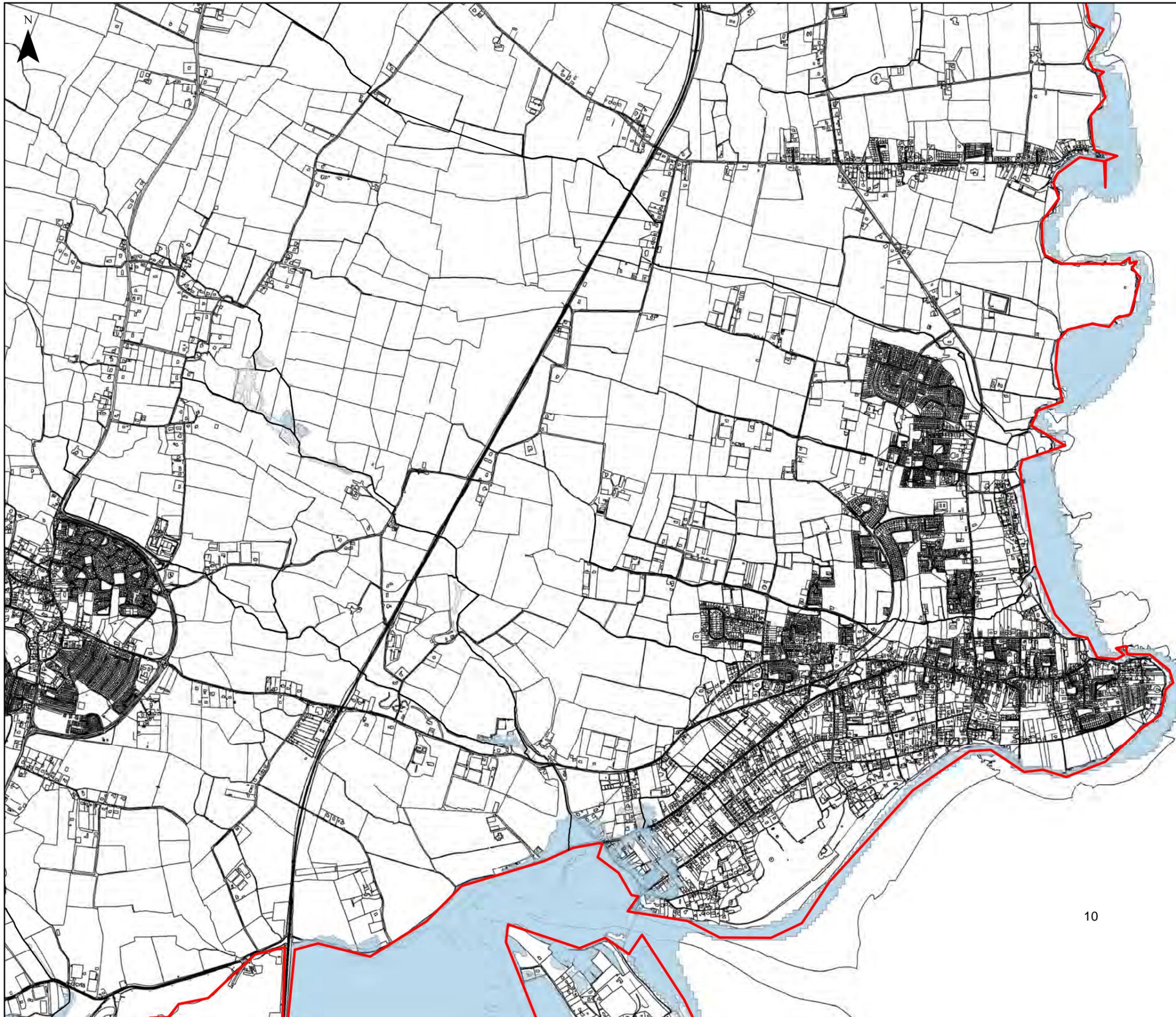
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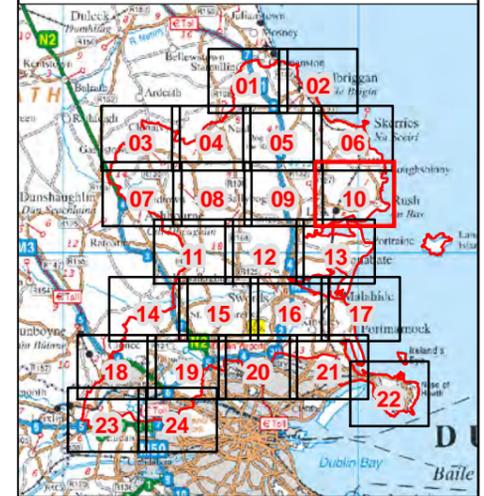
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### Legend

- Watercourses
- Fingal County Boundary
- Defended Area
- Flood Zone A - 1% AEP (Fluvial) or 0.5% AEP (Coastal) 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)
- Indicative Flood Extents



Client



Project

**Strategic Flood Risk Assessment**

Title

**Flood Zone Mapping**

Figure

**Map 10 of 24**



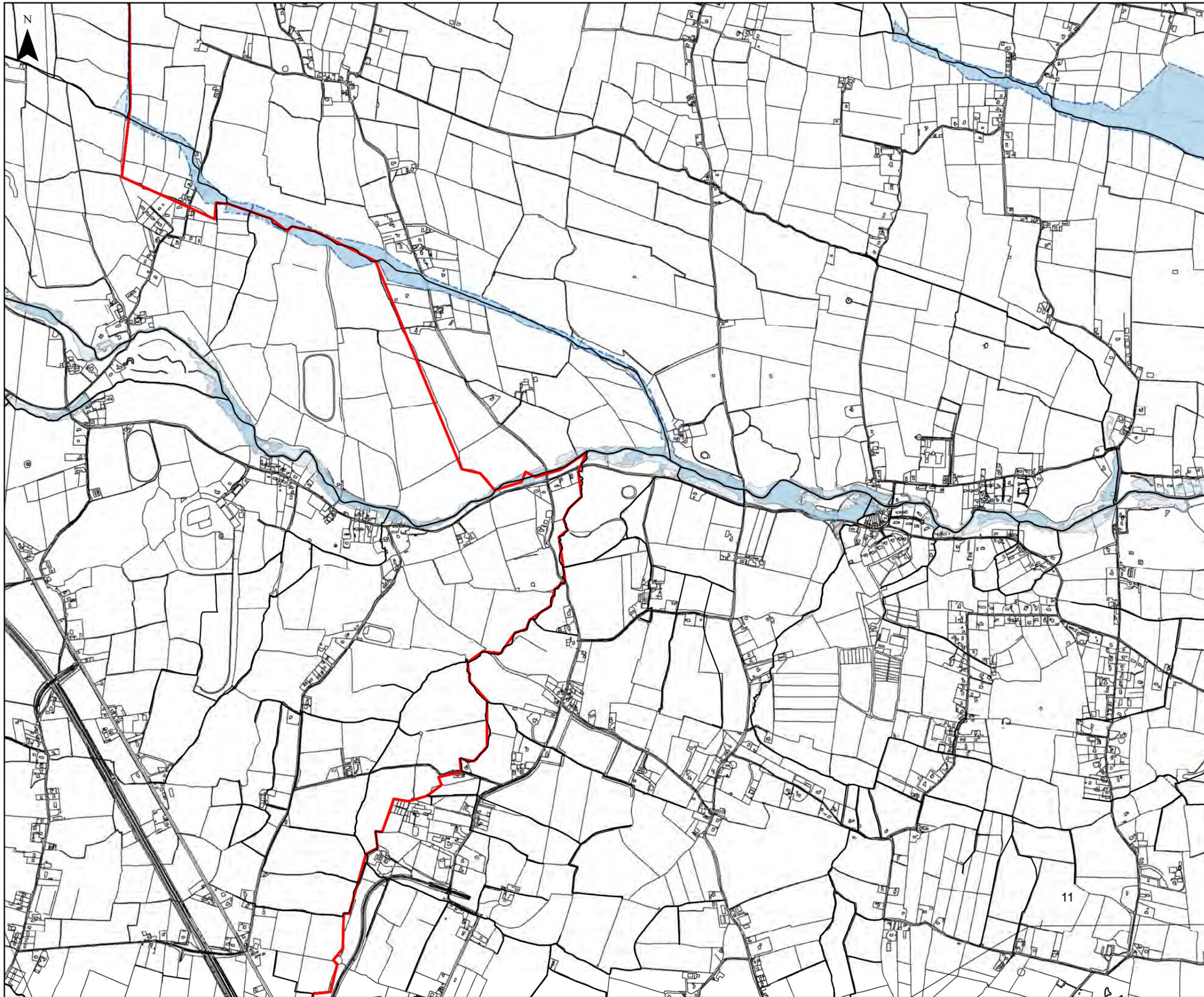
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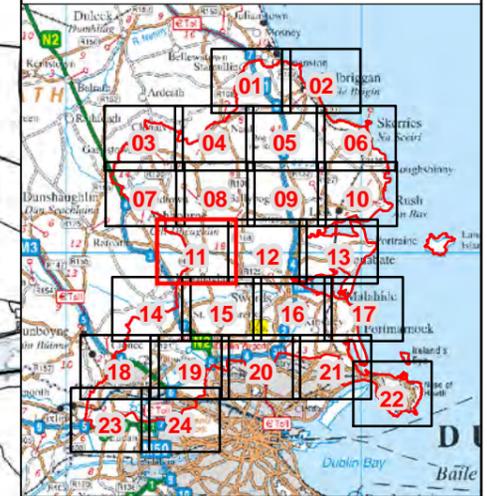
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### Legend

-  Watercourses
-  Fingal County Boundary
-  Defended Area
-  Flood Zone A - 1% AEP (Fluvial) or 0.5% AEP (Coastal) 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)
-  Indicative Flood Extents



Client



Project

**Strategic Flood Risk Assessment**

Title

**Flood Zone Mapping**

Figure

**Map 11 of 24**



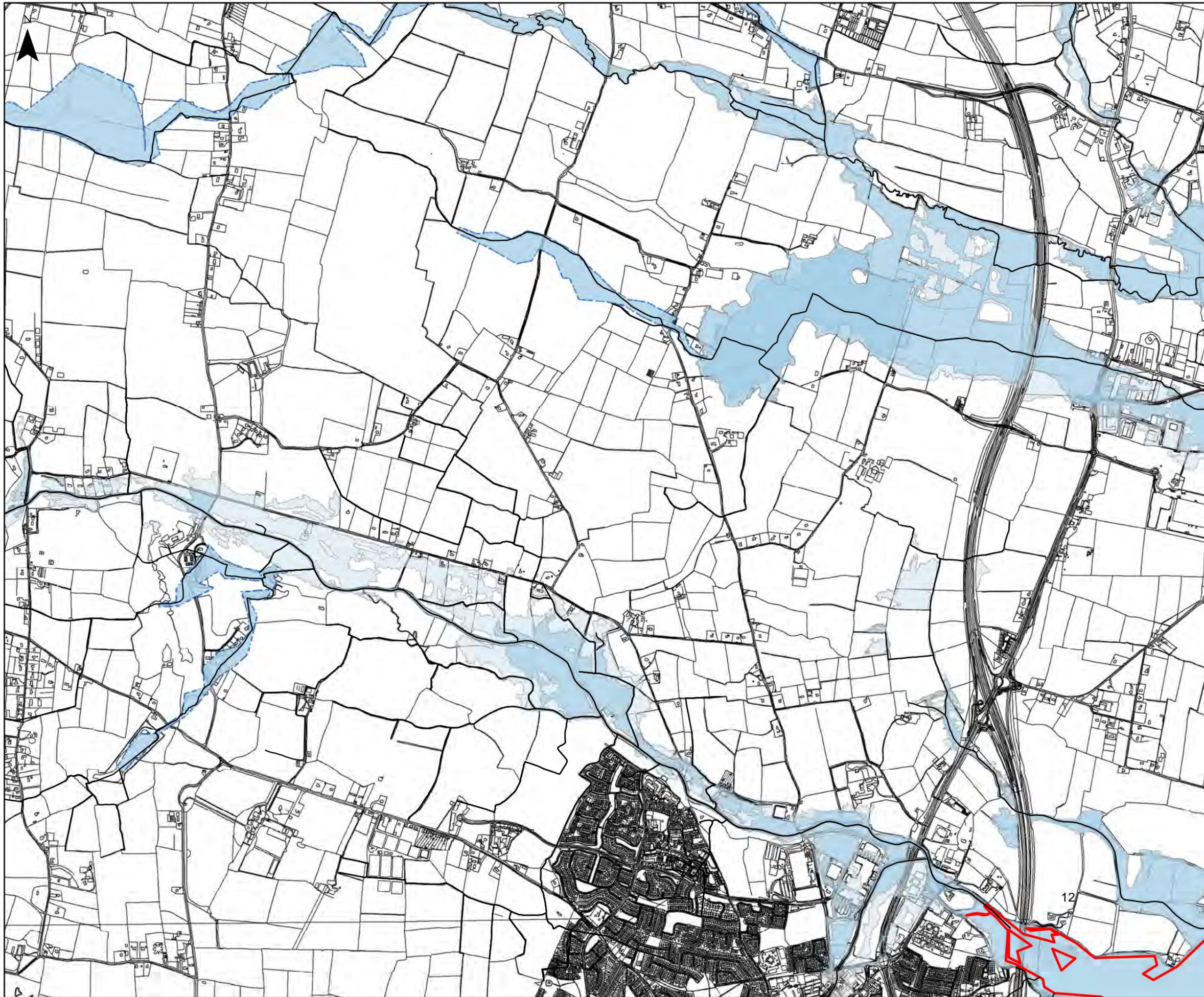
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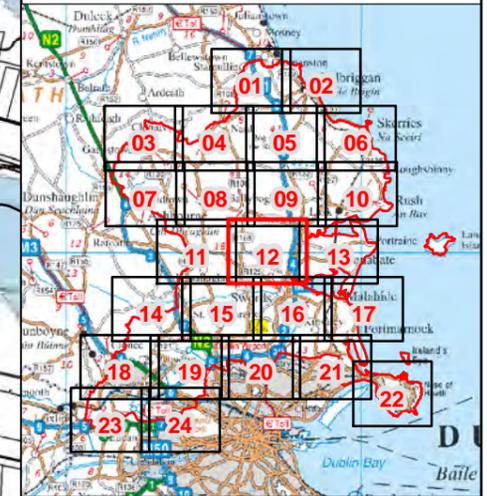
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### Legend

- Watercourses
- Fingal County Boundary
- ▨ Defended Area
- Flood Zone A - 1% AEP (Fluvial) or 0.5% AEP (Coastal) 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)
- Indicative Flood Extents



Client

Comhairle Contae Fhine Gall  
Fingal County Council

Project  
**Strategic Flood Risk Assessment**

Title  
**Flood Zone Mapping**

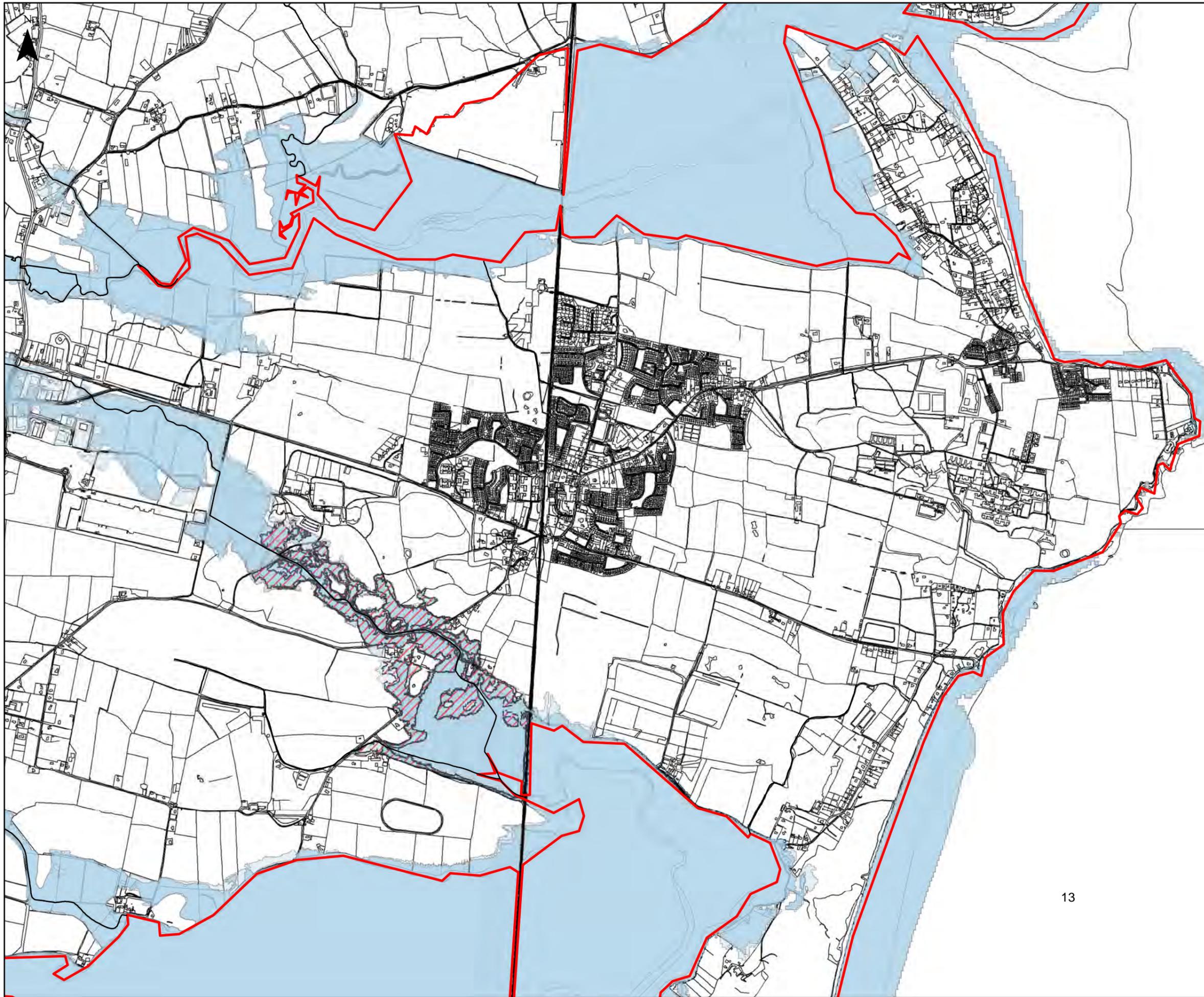
Figure  
**Map 12 of 24**

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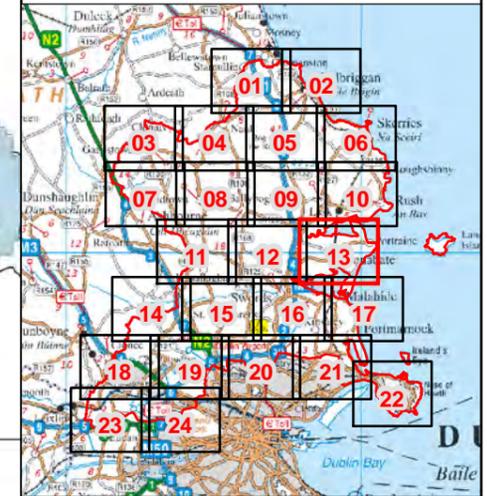
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### Legend

-  Watercourses
-  Fingal County Boundary
-  Defended Area
-  Flood Zone A - 1% AEP (Fluvial) or 0.5% AEP (Coastal) 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)
-  Indicative Flood Extents



Client



Project

**Strategic Flood Risk Assessment**

Title

**Flood Zone Mapping**

Figure

**Map 13 of 24**



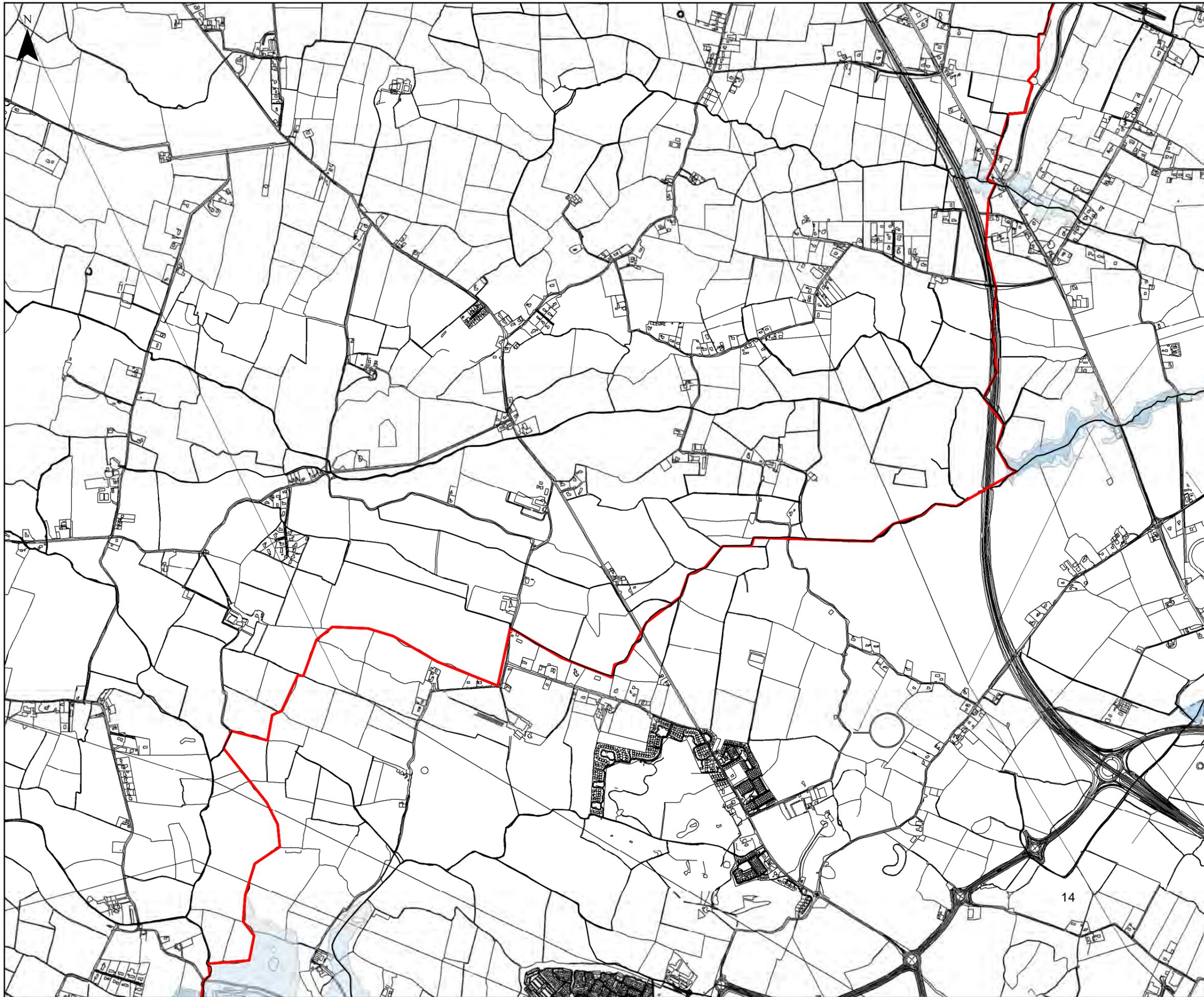
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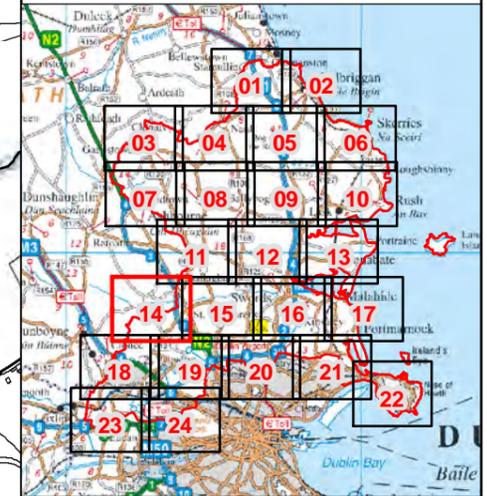
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### Legend

-  Watercourses
-  Fingal County Boundary
-  Defended Area
-  Flood Zone A - 1% AEP (Fluvial) or 0.5% AEP (Coastal) 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)
-  Indicative Flood Extents



Client



Project

**Strategic Flood Risk Assessment**

Title

**Flood Zone Mapping**

Figure

**Map 14 of 24**



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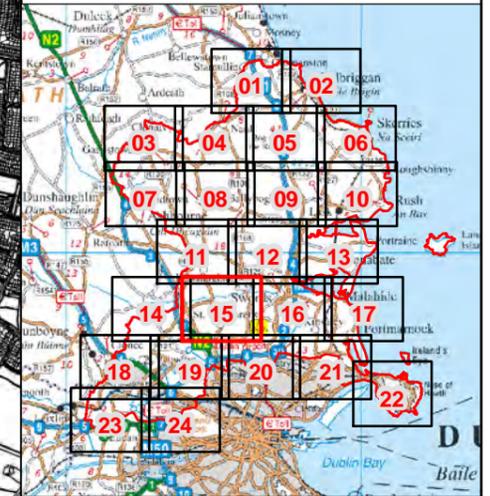
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### Legend

- Watercourses
- Fingal County Boundary
- ▨ Defended Area
- Flood Zone A - 1% AEP (Fluvial) or 0.5% AEP (Coastal) 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)
- Indicative Flood Extents



Client



Project

**Strategic Flood Risk Assessment**

Title

**Flood Zone Mapping**

Figure

**Map 15 of 24**



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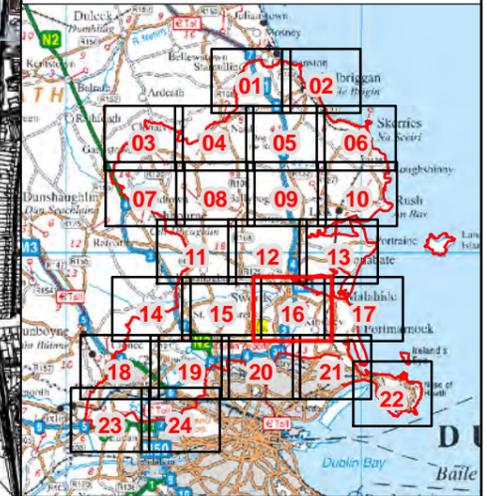
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### Legend

- Watercourses
- ▭ Fingal County Boundary
- ▨ Defended Area
- ▭ Flood Zone A - 1% AEP (Fluvial) or 0.5% AEP (Coastal) 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)
- ▭ Indicative Flood Extents



Client



Project

**Strategic Flood Risk Assessment**

Title

**Flood Zone Mapping**

Figure

**Map 16 of 24**



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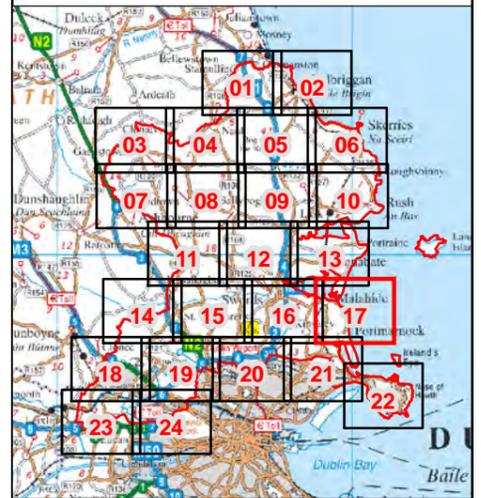
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### Legend

- Watercourses
- Fingal County Boundary
- ▨ Defended Area
- Flood Zone A - 1% AEP (Fluvial) or 0.5% AEP (Coastal) 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)
- Indicative Flood Extents



Client



Project

**Strategic Flood Risk Assessment**

Title

**Flood Zone Mapping**

Figure

**Map 17 of 24**



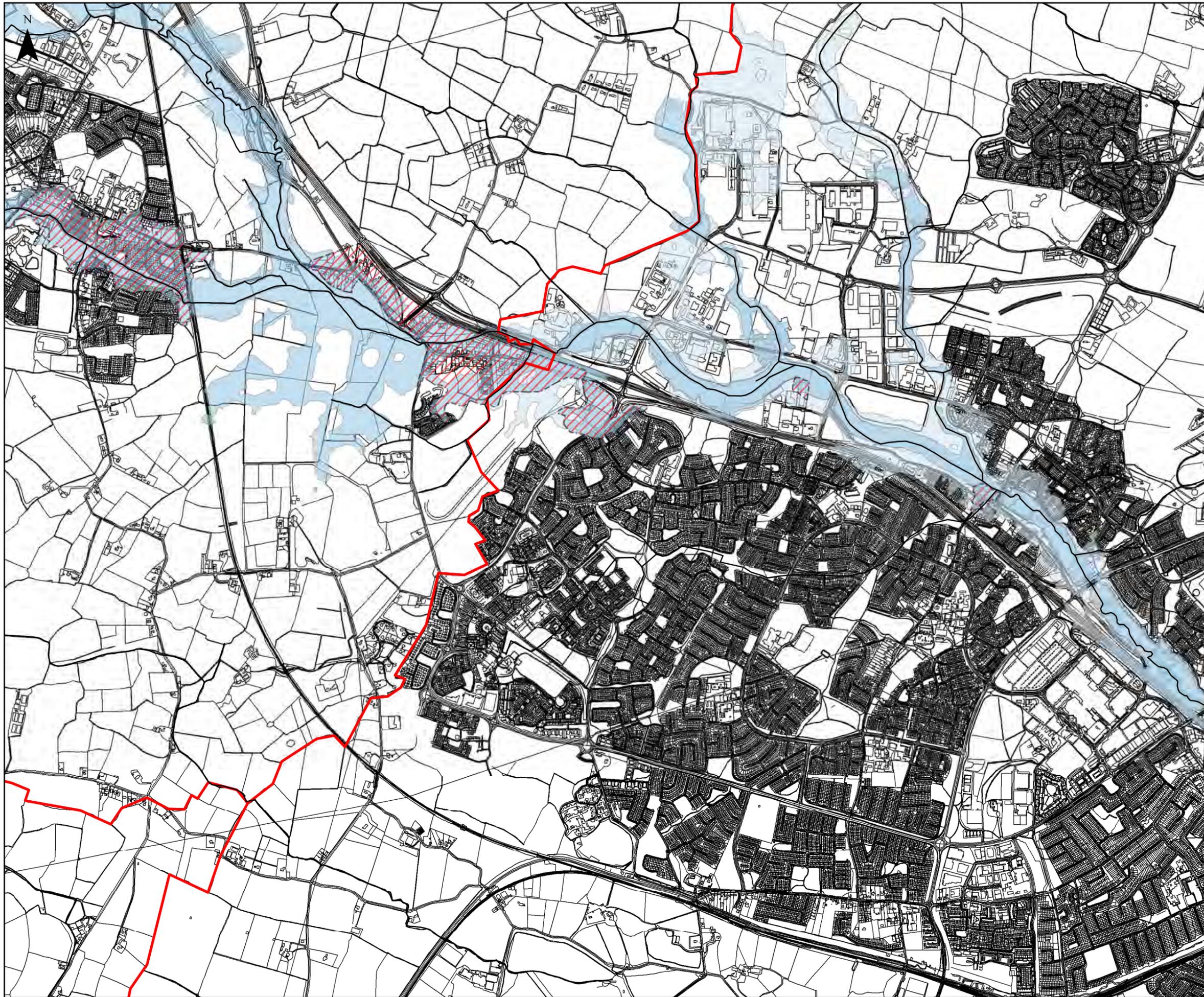
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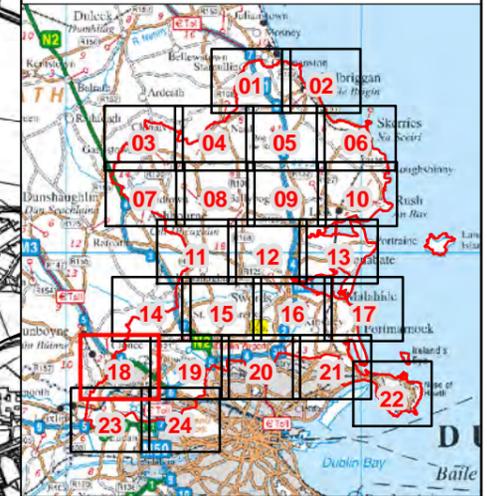
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### Legend

- Watercourses
- Fingal County Boundary
- Defended Area
- Flood Zone A - 1% AEP (Fluvial) or 0.5% AEP (Coastal) 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)
- Indicative Flood Extents



Client



Project

**Strategic Flood Risk Assessment**

Title

**Flood Zone Mapping**

Figure

**Map 18 of 24**



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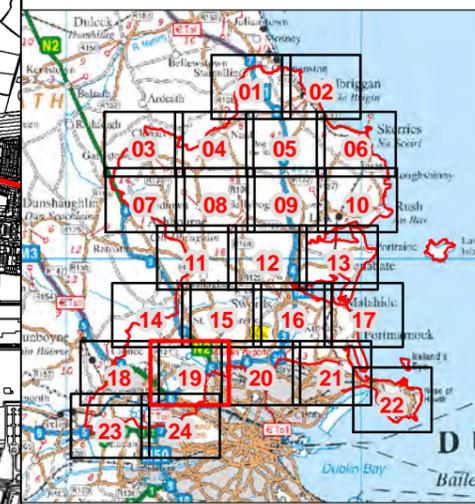
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### Legend

-  Watercourses
-  Fingal County Boundary
-  Defended Area
-  Flood Zone A - 1% AEP (Fluvial) or 0.5% AEP (Coastal) 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)
-  Indicative Flood Extents



Client



**Comhairle Contae Fhine Gall**  
Fingal County Council

Project  
**Strategic Flood Risk Assessment**

Title  
**Flood Zone Mapping**

Figure  
**Map 19 of 24**



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### Legend

- Watercourses
- Fingal County Boundary
- Defended Area
- Flood Zone A - 1% AEP (Fluvial) or 0.5% AEP (Coastal) 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)
- Indicative Flood Extents

**Client**

Comhairle Contae Fhine Gall  
 Fingal County Council

**Project**

**Strategic Flood Risk Assessment**

**Title**

**Flood Zone Mapping**

**Figure**      **Map 20 of 24**

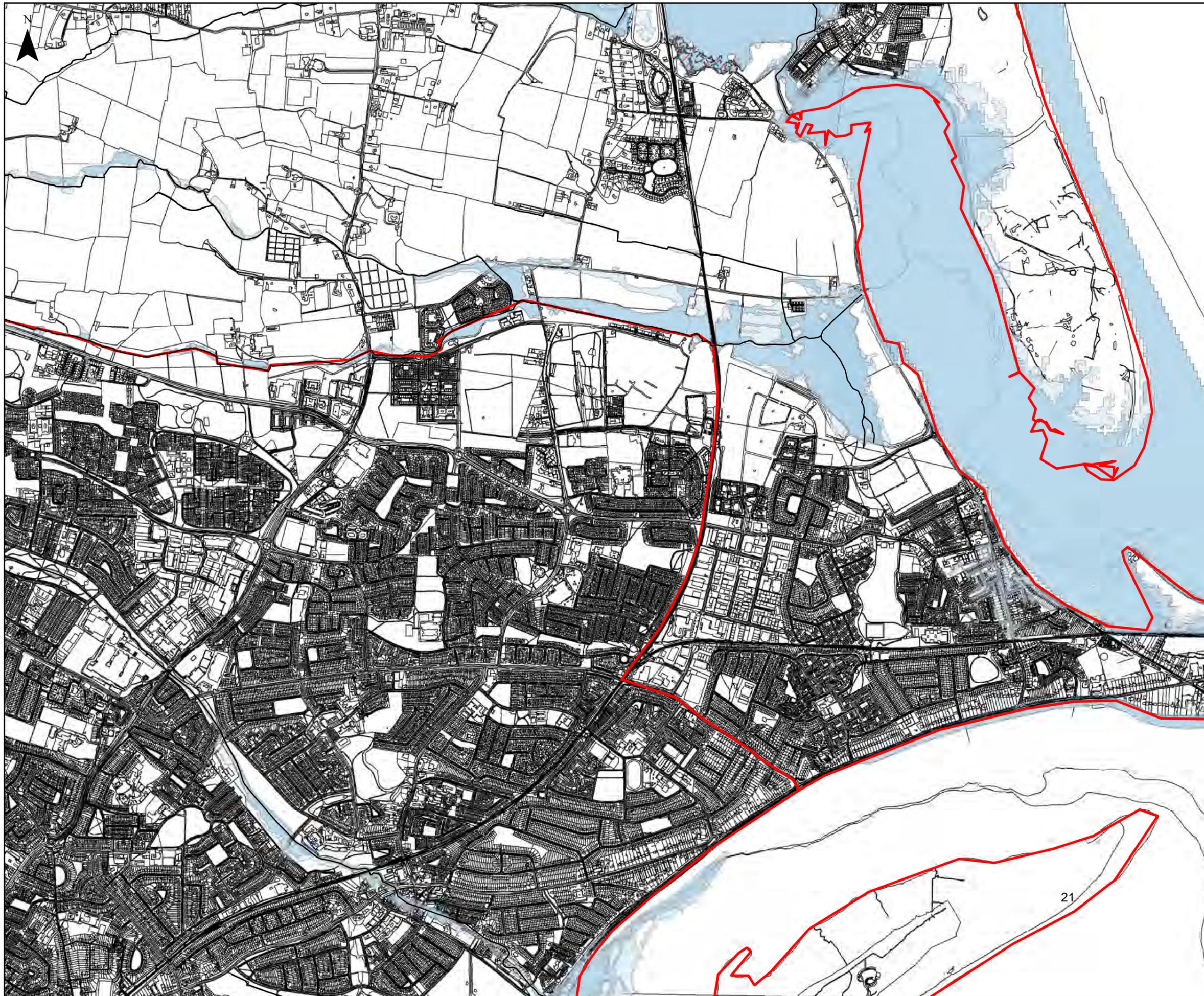
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Approved By:	PM	Drawing No.:	Rev:
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Date:	08/03/2017		

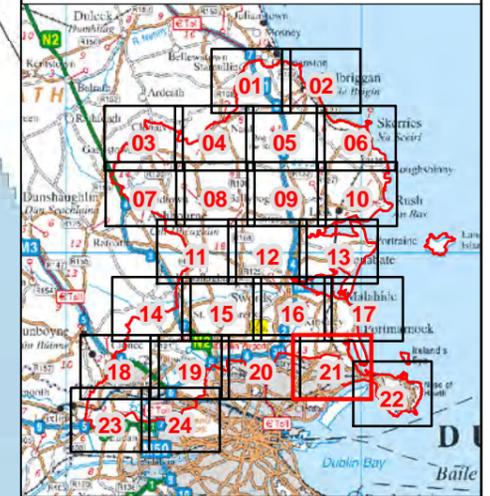
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### Legend

- Watercourses
- Fingal County Boundary
- Defended Area
- Flood Zone A - 1% AEP (Fluvial) or 0.5% AEP (Coastal) 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)
- Indicative Flood Extents



Client



Project

**Strategic Flood Risk Assessment**

Title

**Flood Zone Mapping**

Figure

**Map 21 of 24**



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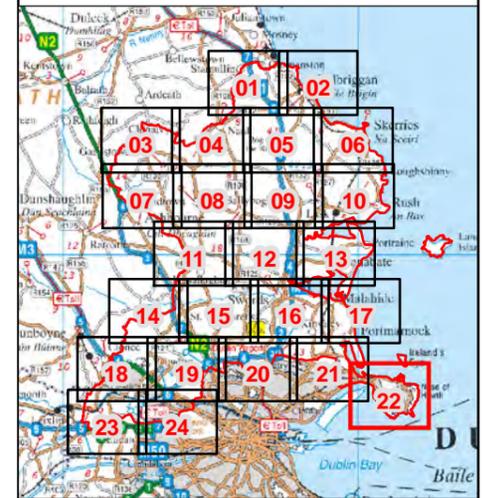
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### Legend

- Watercourses
- Fingal County Boundary
- Defended Area
- Flood Zone A - 1% AEP (Fluvial) or 0.5% AEP (Coastal) 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)
- Indicative Flood Extents



Client



Project

**Strategic Flood Risk Assessment**

Title

**Flood Zone Mapping**

Figure

**Map 22 of 24**



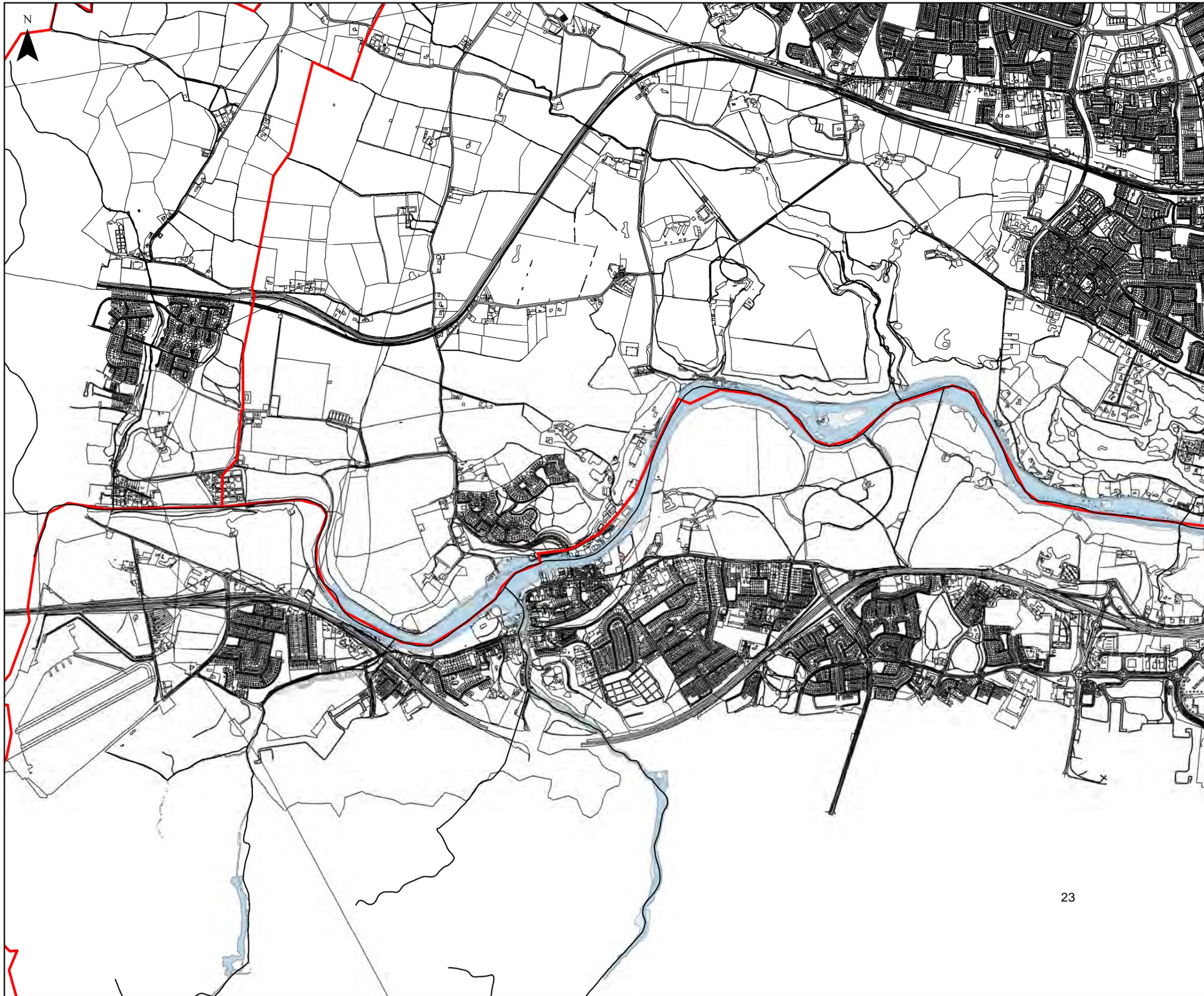
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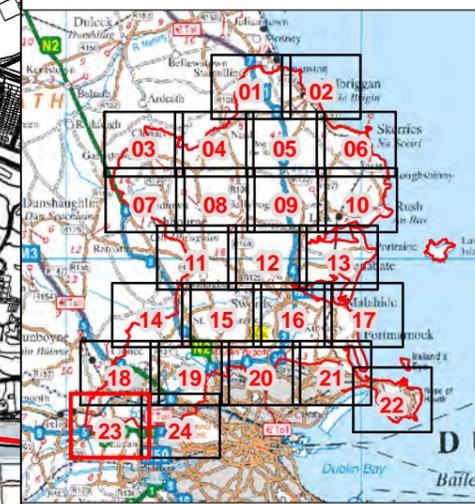
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### Legend

-  Watercourses
-  Fingal County Boundary
-  Defended Area
-  Flood Zone A - 1% AEP (Fluvial) or 0.5% AEP (Coastal) 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)
-  Indicative Flood Extents



Client



Project

**Strategic Flood Risk Assessment**

Title

**Flood Zone Mapping**

Figure

**Map 23 of 24**



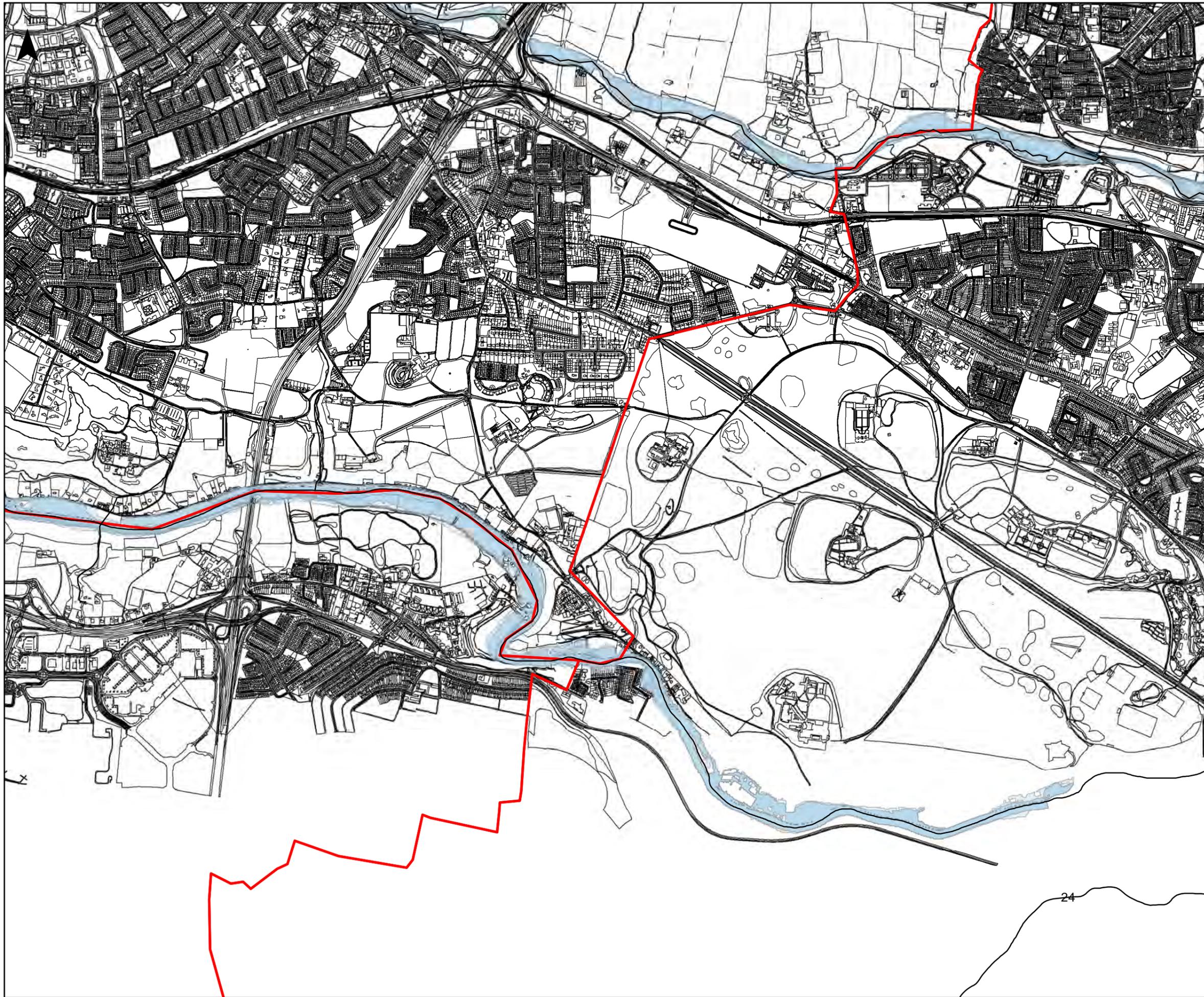
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#### Issue Details

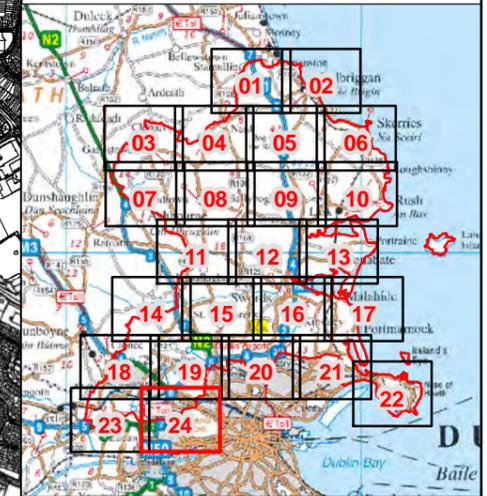
Drawn By: BT	Project No. MDW0716
Checked By: BC	File Ref: MDW0716arc0001D03
Approved By: PM	Drawing No. Rev:
Scale: 1: 20,000 @ A3	Arc0001 A01
Date: 08/03/2017	

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### Legend

-  Watercourses
-  Fingal County Boundary
-  Defended Area
-  Flood Zone A - 1% AEP (Fluvial) or 0.5% AEP (Coastal) 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)
-  Indicative Flood Extents



Client



Project

**Strategic Flood Risk Assessment**

Title

**Flood Zone Mapping**

Figure

**Map 24 of 24**



West Pier Business Campus,  
Dun Laoghaire,  
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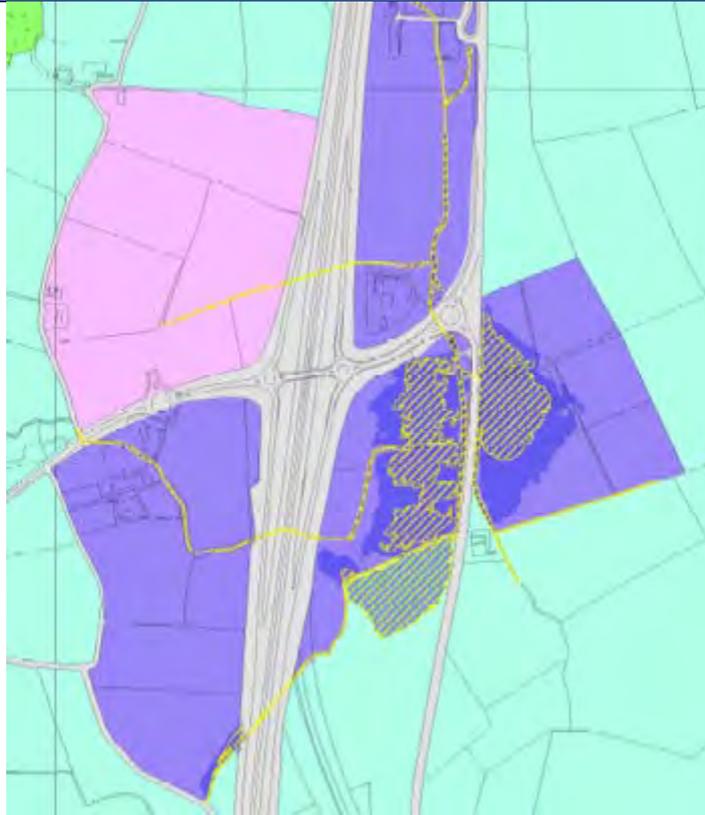
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**APPENDIX B**

**DEVELOPMENT PLAN JUSTIFICATION TESTS**



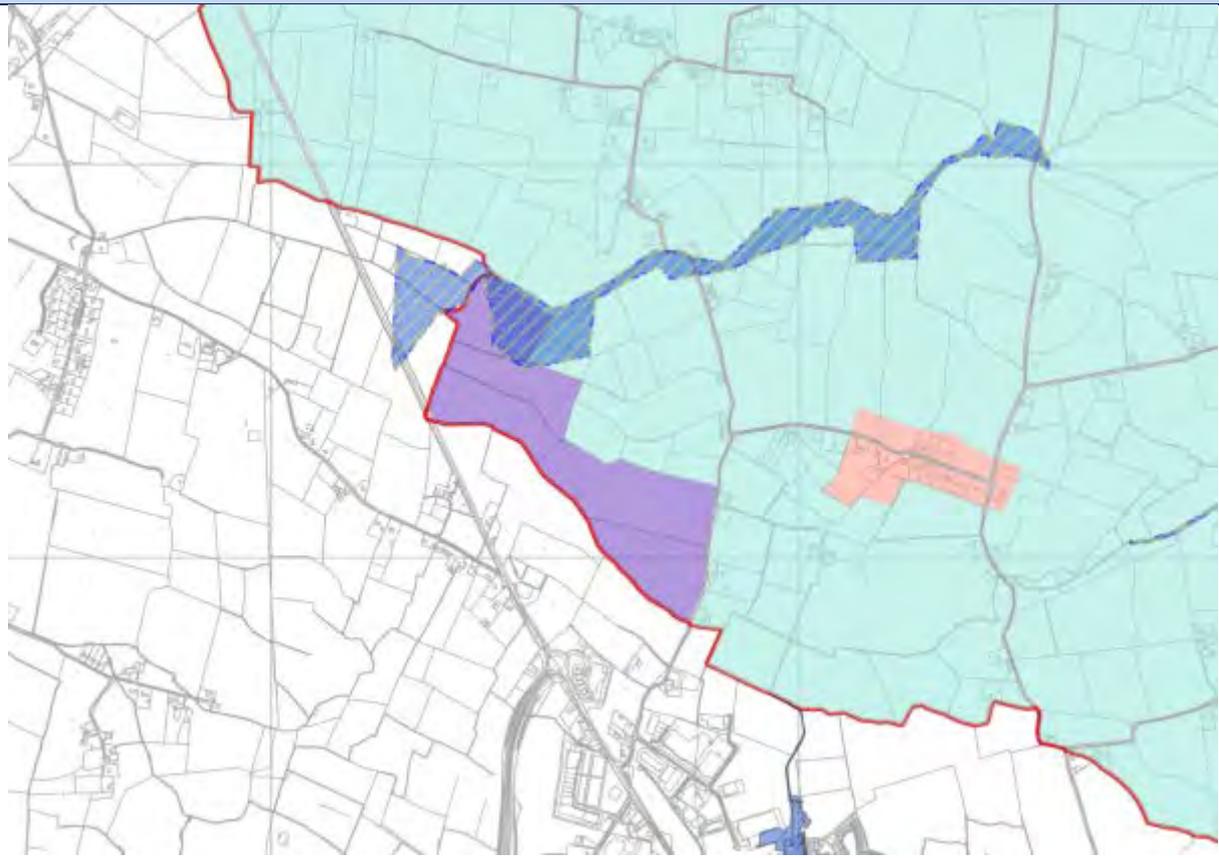
**Development COURTLOUGH**



<p>Criteria 1</p>	<p>Courtclough is a small commercial area located to the South of Balbriggan. It is a long established area. Courtclough provides opportunities for local employment where the retention of existing enterprises and the promotion of new local employment opportunities will be encouraged, in accordance with the Regional Planning Guidelines.</p>
<p>Criteria 2</p>	<p>The area is already established with a number of existing premises. A portion within one of the outer zoned sites is affected by flood risk. The site is currently undeveloped. The zoning is considered necessary to facilitate the overall zoning which has very good access to the M1. No other lands are available.</p>
<p>Criteria 3</p>	<p>The zoning allows for less vulnerable development and any future planning applications will require a detailed site specific flood risk assessment.</p> <p>Site Specific FRA should address the following:</p> <ul style="list-style-type: none"> <li>▪ Apply sequential approach should be applied through site planning and should avoid encroachment onto, or loss of, the flood plain.</li> <li>▪ Highly Vulnerable Development shall not be permitted in Flood Zone A or B.</li> <li>▪ Development in Flood Zone A should be either open space or water compatible.</li> <li>▪ FRA should address residual risk of culvert blockage (where applicable), increased flood extents under climate change scenarios and pluvial risk which should be aimed at setting finished floor levels.</li> <li>▪ Compensatory storage for development that results in a loss of floodplain within Flood Zone A must be provided on a level for level basis.</li> </ul>

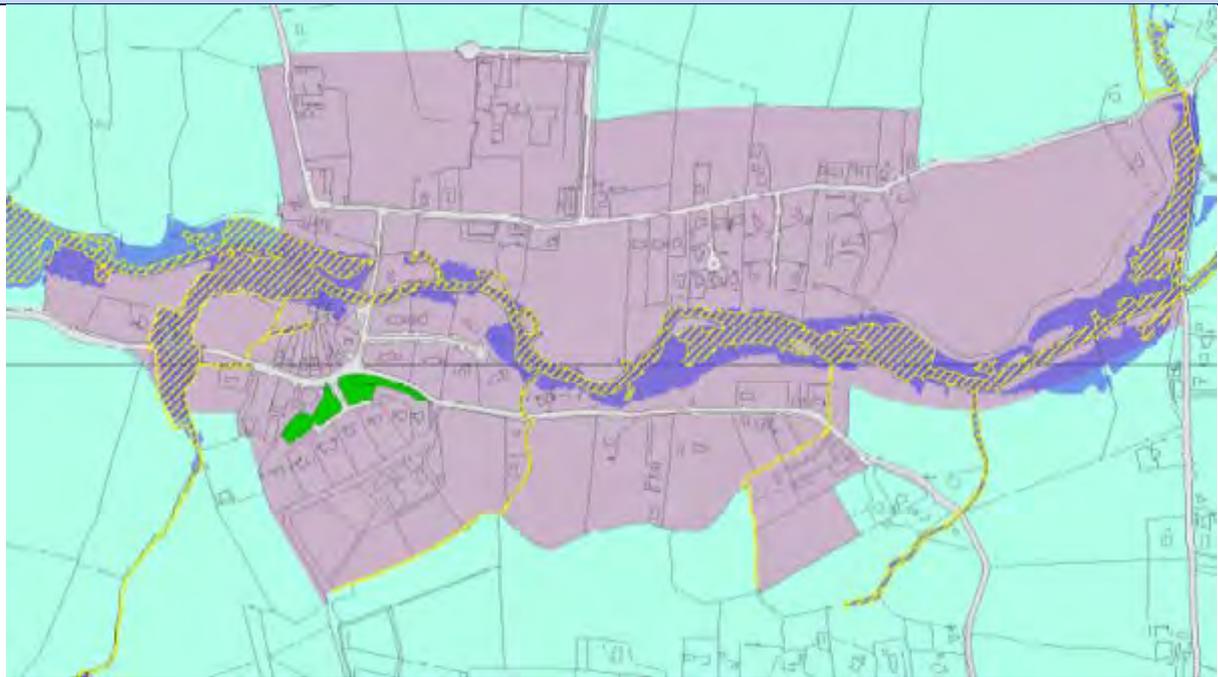
**Conclusion Pass.** It is recommended that any proposals for future development of this land will be subject to a site specific FRA to ensure that development is appropriate and satisfies Criteria 3 of the Justification Test

**Development BALLYMADUN**



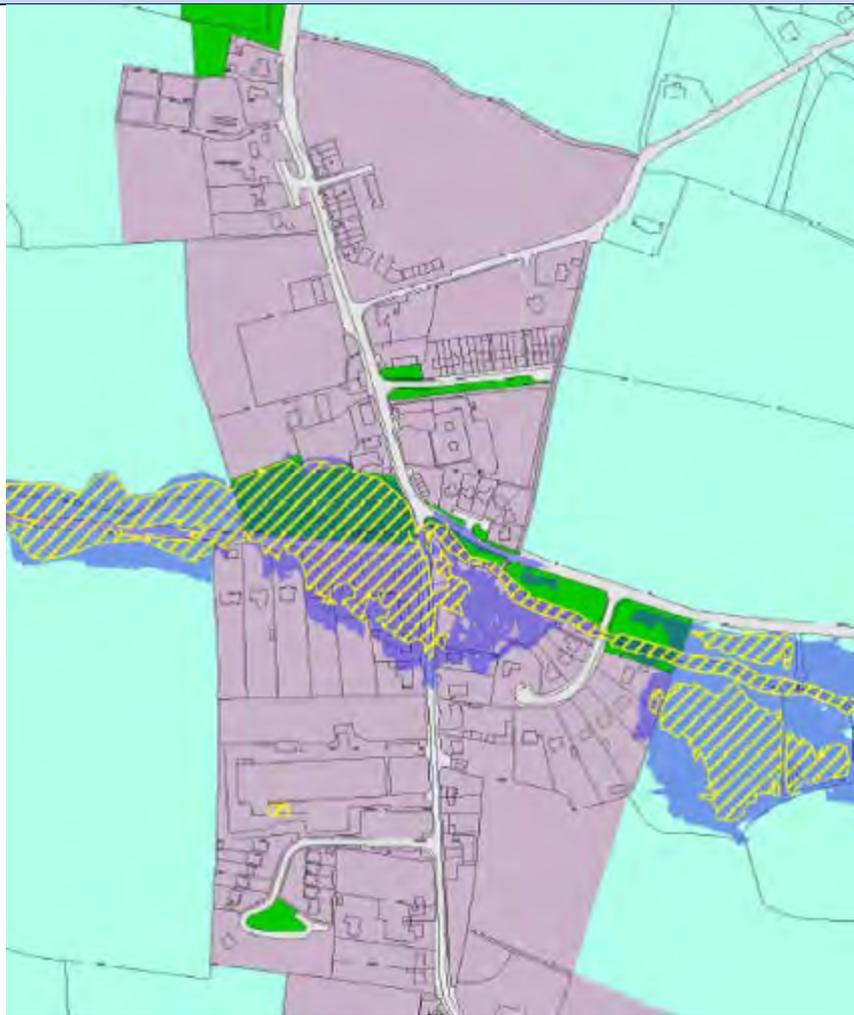
Criteria 1	Ballymadun is a small rural cluster. The zoned lands will provide employment opportunities for the nearby rural population.
Criteria 2	The site is undeveloped but the zoning is considered necessary to provide employment.
Criteria 3	<p>A portion of the zoned lands is identified at risk of flooding from the indicative PFRA flood mapping. The zoning allows for less vulnerable development and any future planning applications will require a detailed site specific flood risk assessment.</p> <p>Site Specific FRA should address the following:</p> <ul style="list-style-type: none"> <li>▪ Carry out a Stage 2 Assessment to identify flood zones A and B adjacent to the Hurley River</li> <li>▪ Apply sequential approach should be applied through site planning and should avoid encroachment onto, or loss of, the flood plain.</li> <li>▪ Highly Vulnerable Development shall not be permitted in Flood Zone A or B.</li> <li>▪ Development in Flood Zone A should be either open space or water compatible.</li> <li>▪ FRA should address residual risk of culvert blockage (where applicable), increased flood extents under climate change scenarios and pluvial risk which should be aimed at setting finished floor levels.</li> </ul>
<p><b>Conclusion: Pass.</b> It is recommended that any proposals for future development of this land will be subject to a site specific FRA to ensure that development is appropriate and satisfies Criteria 3 of the Justification Test.</p>	

**Development ROLESTOWN**



Criteria 1	<b>Rolestown</b> is a small rural village. There is current LAP for the area. The zoning is integral to the development of the village and is in accordance with Regional Planning guidelines and the core and settlement strategy of the Plan.
Criteria 2	Only a small portion of the zoned lands is at risk of flooding. This area is at the centre of Rolestown and includes the site of an historic Mill. The proposed zoning is considered necessary. No other lands are suitable.
Criteria 3	<p>A detailed site specific FRA is to be carried out and submitted with any planning application to address flood risk, propose mitigation measures and assign appropriate development.</p> <p>Site Specific FRAs should address the following:</p> <ul style="list-style-type: none"> <li>▪ Apply sequential approach should be applied through site planning and should avoid encroachment onto, or loss of, the flood plain.</li> <li>▪ Highly Vulnerable Development shall not be permitted in Flood Zone A or B</li> <li>▪ Land in Flood Zone A should be either open space or water compatible</li> <li>▪ FRAs should be cognisant of flood defences in the area.</li> <li>▪ FRA should address residual risk of culvert blockage (where applicable), increased flood extents under climate change scenarios and pluvial risk which should be aimed at setting finished floor levels.</li> </ul>
<p>Conclusion: <b>Pass</b>. It is recommended that any proposals for future development of this land will be subject to a site specific FRA to ensure that development is appropriate and satisfies Criteria 3 of the Justification Test</p>	

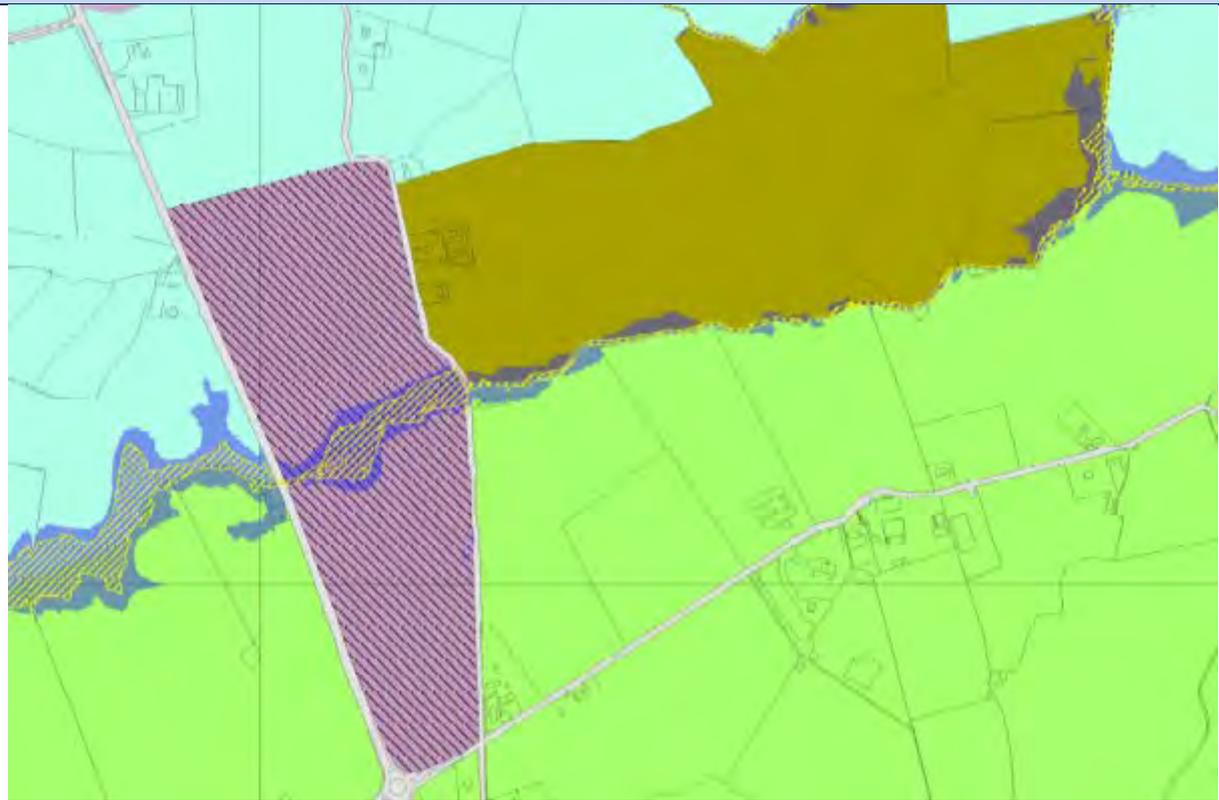
**Development BALLYBOUGHAL**



Criteria 1	<p><b>Ballyboughal</b> is a small rural village. The current LAP allows for development of the village, in accordance with Regional Planning guidelines. The site accords with the Core and Settlement strategies of the Plan.</p>
Criteria 2	<p>This area is at the centre of Ballyboughal and is essential to facilitate the expansion of the centre of the settlement. The area is also at the centre of the LAP lands. The site is undeveloped but there is a permission on a portion of the lands. The proposed zoning is considered necessary. No other lands are suitable.</p>
Criteria 3	<p>A detailed site specific FRA is to be carried out and submitted with any planning application to address flood risk, propose mitigation measures and assign appropriate development.</p> <p>Site Specific FRAs should address the following:</p> <ul style="list-style-type: none"> <li>▪ Apply sequential approach should be applied through site planning and should avoid encroachment onto, or loss of, the flood plain.</li> <li>▪ Highly Vulnerable Development shall not be permitted in Flood Zone A or B</li> <li>▪ Land in Flood Zone A should be either open space or water compatible</li> <li>▪ FRA should address residual risk of culvert blockage (where applicable), increased flood extents under climate change scenarios and pluvial risk which should be aimed at setting finished floor levels.</li> </ul>

**Conclusion Pass.** It is recommended that any proposals for future development of this land will be subject to a site specific FRA to ensure that development is appropriate and satisfies Criteria 3 of the Justification Test

**Development COOLATRATH**



**Criteria 1** **Coolatrath** is a small commercial area located off the R130. The zoning provides for a Food Park and a Rural Business area and will provide local employment opportunities. The zoned lands will provide for rural employment opportunities for the nearby rural population.

**Criteria 2** The site is undeveloped but the zoning is considered necessary to provide employment. The zoned lands will be the subject of a Masterplan.

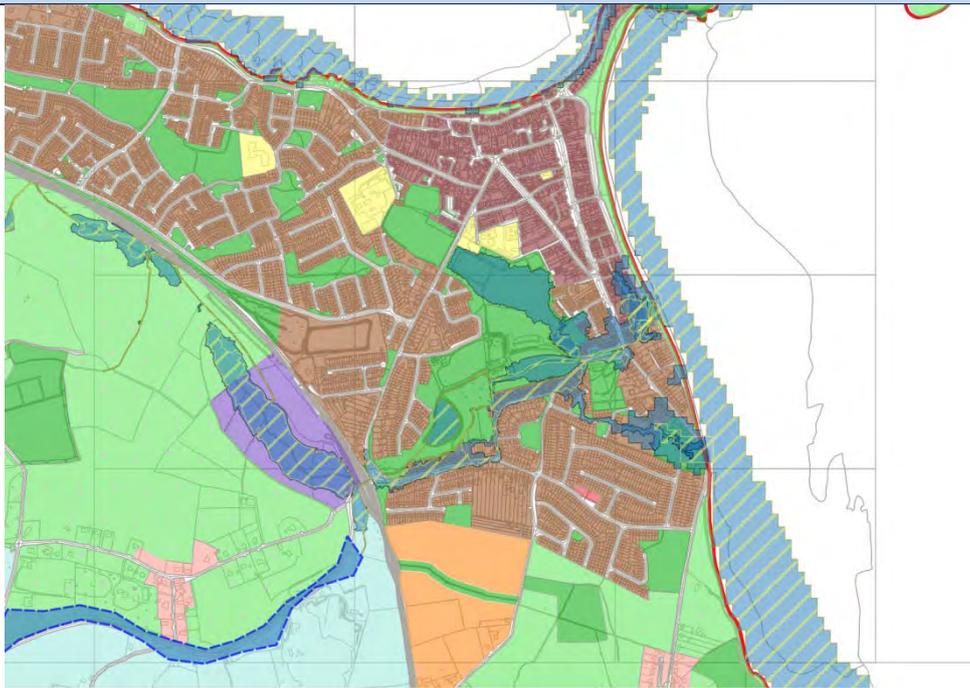
**Criteria 3** Only a small portion of the zoned lands is at risk of flooding. The zoning allows for less vulnerable development and any future planning applications will require a detailed site specific flood risk assessment. Further FRA will be completed as part of a Masterplan for the area.

Site Specific FRA should address the following:

- 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
- Land in Flood Zone A adjacent to the Ward River should be either open space or water compatible
- FRA should address residual risk of culvert blockage (where applicable), increased flood extents under climate change scenarios and pluvial risk which should be aimed at setting finished floor levels.

**Conclusion Pass.** It is recommended that any proposals for future development of this land will be subject to a site specific FRA to ensure that development is appropriate and satisfies Criteria 3 of the Justification Test

**Development SKERRIES**



Criteria 1	<p>Skerries is designated as a large town in the Regional Planning Guidelines. The zoned lands represent employment opportunities located to the west of Skerries. This will provide a significant local employment area where the promotion of new local employment opportunities will be encouraged, in accordance with the Regional Planning Guidelines.</p>
Criteria 2	<p>The site is undeveloped but the zoning is considered necessary to provide opportunity for employment. The area is on the outskirts of the town of Skerries and is considered appropriate zoning. A Masterplan will be prepared for these lands.</p>
Criteria 3	<p>The zoning allows for less vulnerable development and any future planning applications will require a detailed site specific flood risk assessment. These lands will be subject to a Masterplan which will include for a Strategic Flood Risk Assessment.</p> <p>Site Specific FRA should address the following:</p> <ul style="list-style-type: none"> <li>▪ Apply sequential approach should be applied through site planning and should avoid encroachment onto, or loss of, the flood plain.</li> <li>▪ Highly Vulnerable Development shall not be permitted in Flood Zone A or B.</li> <li>▪ Development in Flood Zone A should be either open space or water compatible.</li> <li>▪ FRA should address residual risk of culvert blockage (where applicable), increased flood extents under climate change scenarios and pluvial risk which should be aimed at setting finished floor levels.</li> <li>▪ Compensatory storage for development that results in a loss of floodplain within Flood Zone A must be provided on a level for level basis and the land given to storage must be land which does not flood in the 1% AEP flood event.</li> <li>▪ Any mitigation measures that may be proposed for this site should be cognisant of the proposals for the Skerries flood relief scheme.</li> </ul>

**Conclusion Pass.** It is recommended that any proposals for future development of this land will be subject to a site specific FRA to ensure that development is appropriate and satisfies Criteria 3 of the Justification Test.

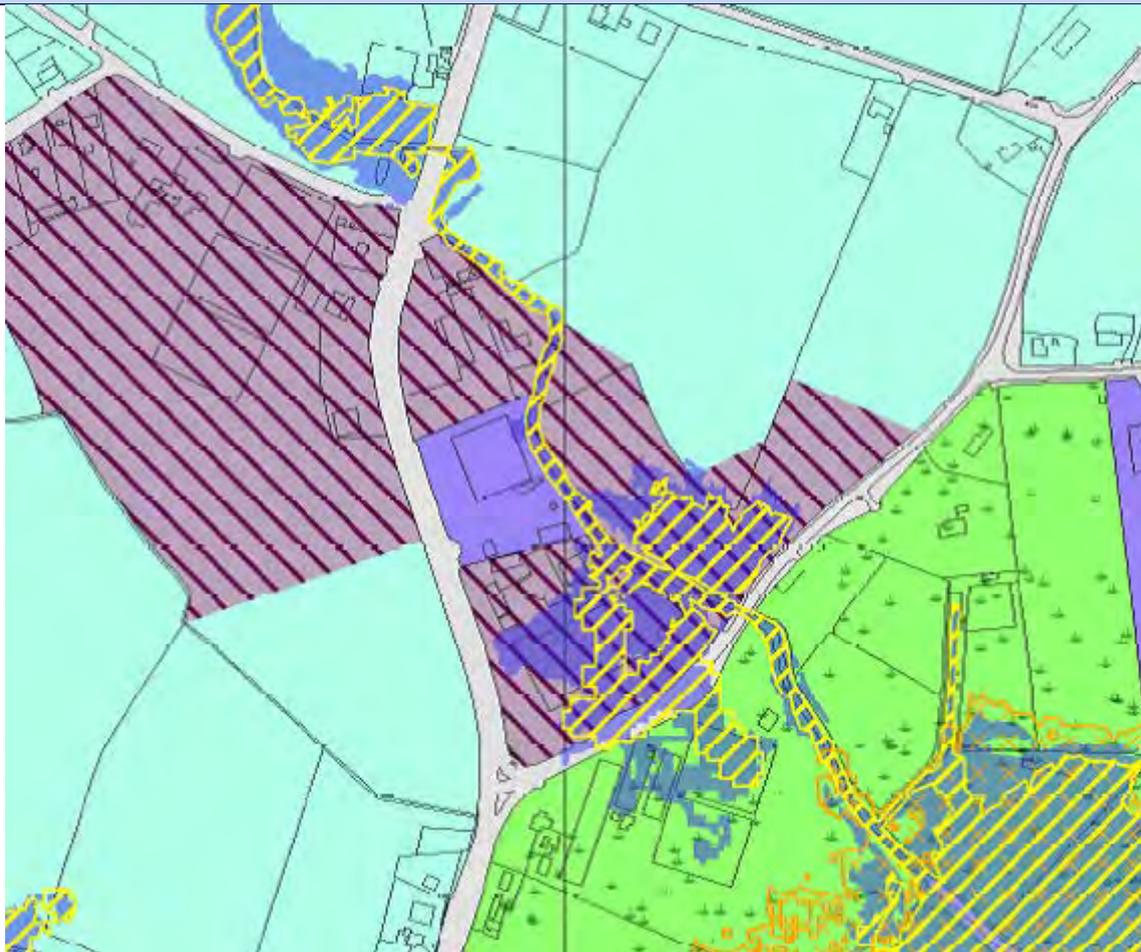
**Development RUSH**



Criteria 1	Rush is designated as a Moderate Sustainable Growth Town in the Regional Planning Guidelines and the Development Plan Core and Settlement Strategies. These lands to the west of Rush, contain long established dwellings and the area is considered an integral part of the town.
Criteria 2	This area is a long established area and the zoning is necessary to provide for some infill development within the existing town boundary. The lands lie within and adjacent to the areas identified will be the subject of a separate study along South Shore Road area of the town.
Criteria 3	<p>A detailed site specific FRA is to be carried out and submitted with any planning application to address flood risk, propose mitigation measures and assign appropriate development.</p> <p>Site Specific FRAs should address the following:</p> <ul style="list-style-type: none"> <li>▪ Apply sequential approach should be applied through site planning and should avoid encroachment onto, or loss of, the flood plain.</li> <li>▪ Highly Vulnerable Development shall not be permitted in Flood Zone A or B.</li> <li>▪ Development in Flood Zone A should be either open space or water compatible.</li> <li>▪ FRA should address residual risk of culvert blockage (where applicable), increased flood extents under climate change scenarios and pluvial risk which should be aimed at setting finished floor levels.</li> <li>▪ Any mitigation measures that may be proposed for this site should be cognisant of the proposals for the Rush flood relief scheme.</li> </ul>

**Conclusion Pass.** It is recommended that any proposals for future development of this land will be subject to a site specific FRA to ensure that development is appropriate and satisfies Criteria 3 of the Justification Test.

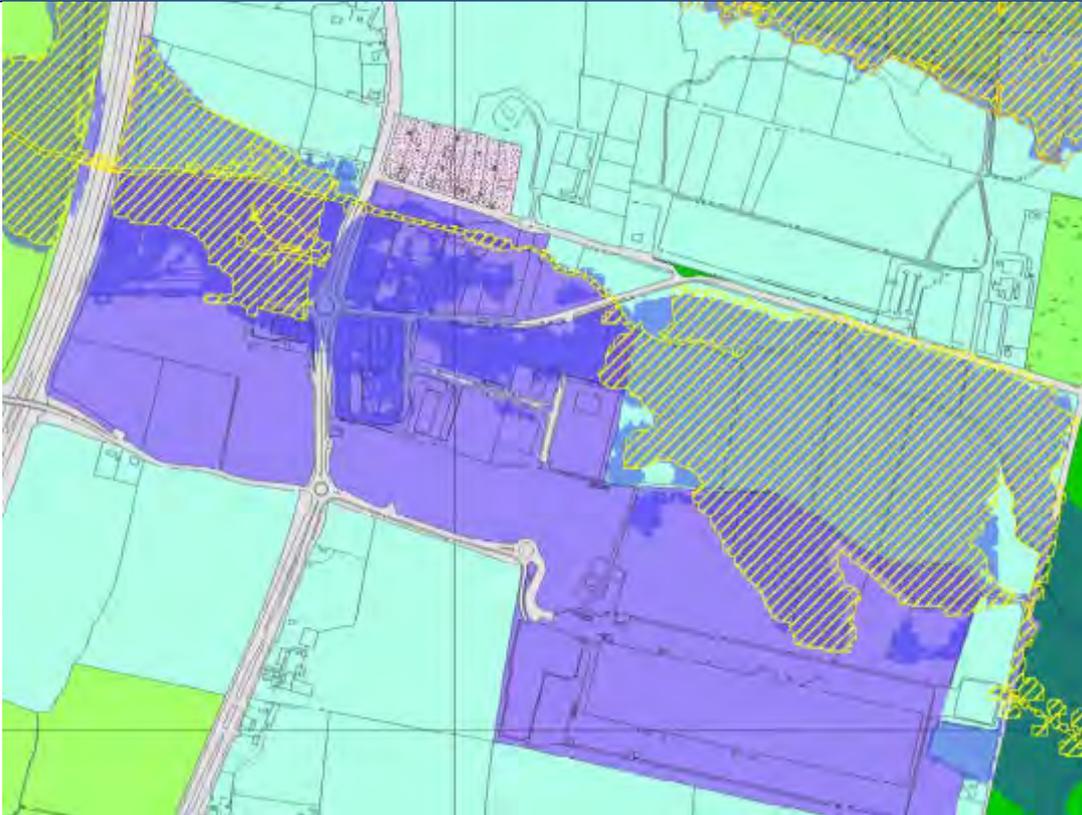
Development BLAKES CROSS, LUSK



Criteria 1	Blakes Cross is a small commercial area located to the south of Lusk, along the R132. Blakes Cross provides a local employment area where the retention of existing enterprises and the promotion of new local employment opportunities will be encouraged, in accordance with the Regional Planning Guidelines.
Criteria 2	This area is a long established area and the zoning is necessary to provide for some employment for the local rural population.
Criteria 3	<p>A detailed site specific FRA is to be carried out and submitted with any planning application to address flood risk, propose mitigation measures and assign appropriate development.</p> <p>Site Specific FRAs should address the following:</p> <ul style="list-style-type: none"> <li>▪ Apply sequential approach should be applied through site planning and should avoid encroachment onto, or loss of, the flood plain.</li> <li>▪ Highly Vulnerable Development shall not be permitted in Flood Zone A or B.</li> <li>▪ Development in Flood Zone A should be either open space or water compatible.</li> <li>▪ FRA should address residual risk of culvert blockage (where applicable), increased flood extents under climate change scenarios and pluvial risk which should be aimed at setting finished floor levels.</li> </ul>

**Conclusion Pass.** It is recommended that any proposals for future development of this land will be subject to a site specific FRA to ensure that development is appropriate and satisfies Criteria 3 of the Justification Test.

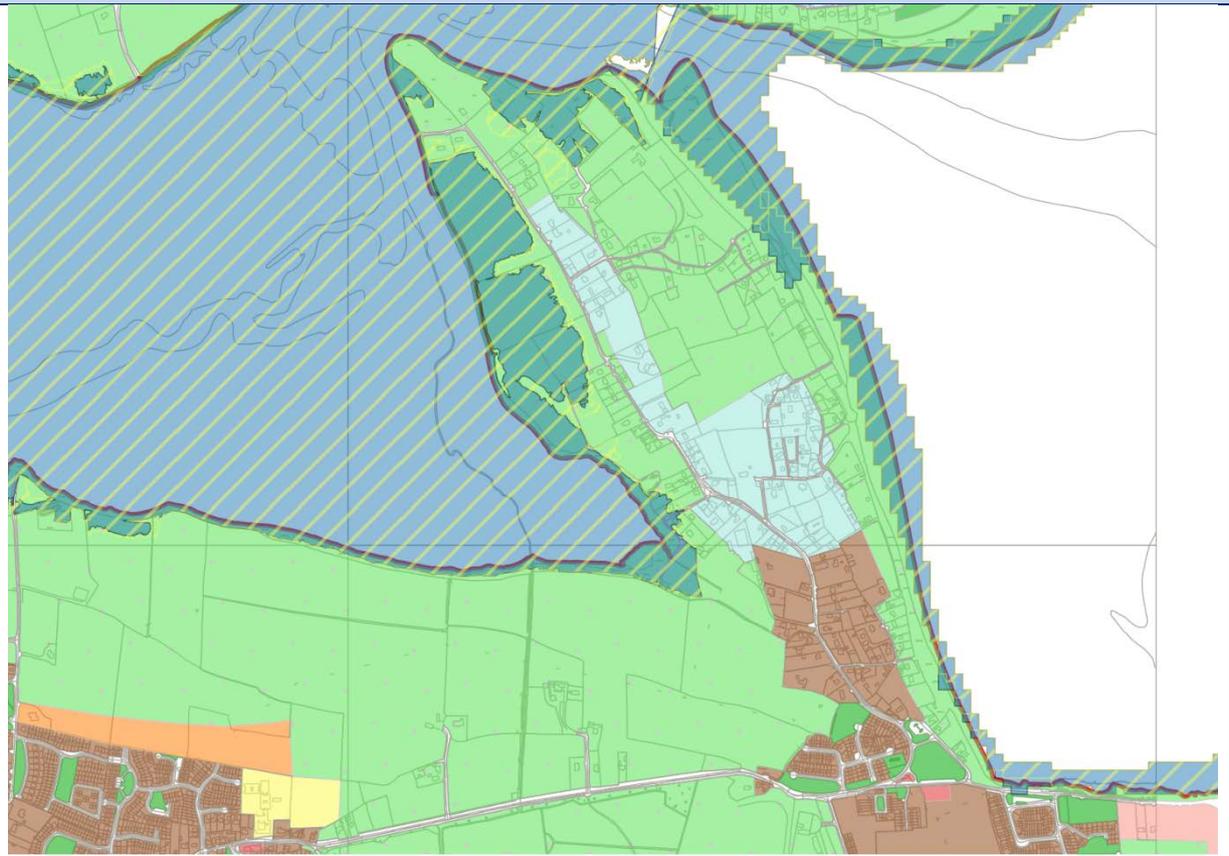
**Development LANESTOWN/TURVEY**



<p>Criteria 1</p>	<p>Lanestown/Turvey is a small commercial area located to the west of Donabate, along the R132. It is a long established area. Lanestown/Turvey provides a local employment area where the retention of existing enterprises and the promotion of new local employment opportunities will be encouraged, in accordance with the Regional Planning Guidelines.</p>
<p>Criteria 2</p>	<p>The area is already established with a number of existing premises. The zoning is considered necessary to facilitate the overall comprehensive development of the lands. The lands have very good access to the R132. No other lands are available. These lands will be the subject of a Masterplan.</p>
<p>Criteria 3</p>	<p>A portion of the zoned lands is at risk of flooding. The zoning allows for less vulnerable development and any future planning applications will require a detailed site specific flood risk assessment. Further flood risk assessment will take place as part of the Masterplan process.</p> <ul style="list-style-type: none"> <li>▪ Apply sequential approach should be applied through site planning and should avoid encroachment onto, or loss of, the flood plain.</li> <li>▪ Highly Vulnerable Development shall not be permitted in Flood Zone A or B.</li> <li>▪ Development in Flood Zone A should be either open space or water compatible.</li> <li>▪ FRA should address residual risk of culvert blockage (where applicable), increased flood extents under climate change scenarios and pluvial risk which should be aimed at setting finished floor levels.</li> <li>▪ Compensatory storage for development that results in a loss of floodplain within Flood Zone A must be provided on a level for level basis and the land given to storage must be land which does not flood in the 1% AEP flood event.</li> </ul>

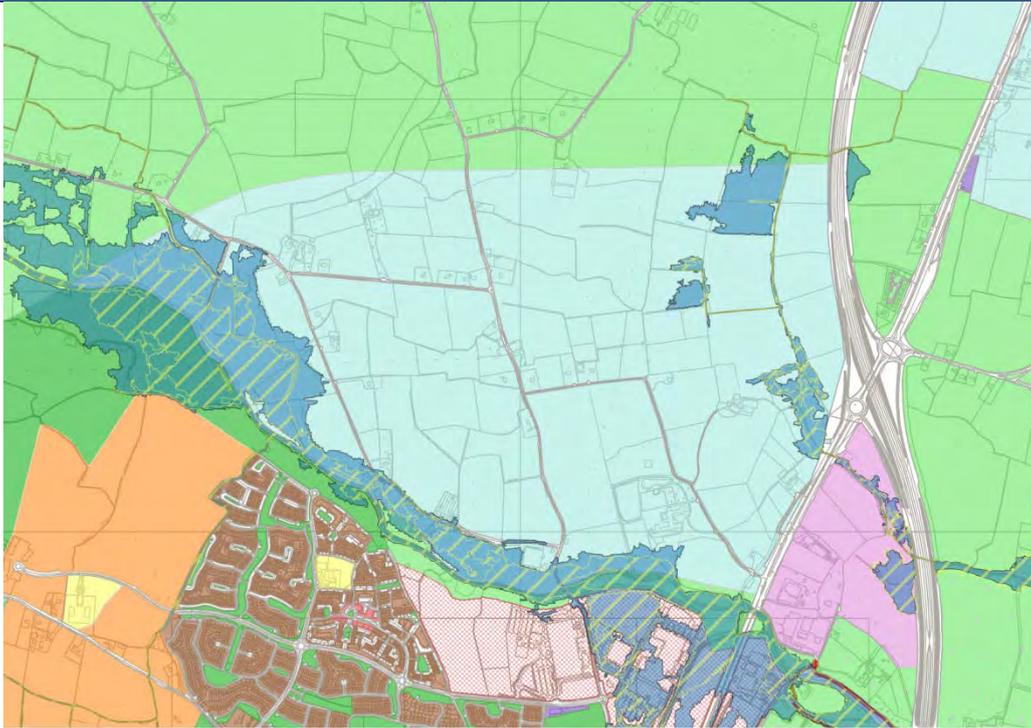
**Conclusion Pass.** It is recommended that any proposals for future development of this land will be subject to a site specific FRA to ensure that development is appropriate and satisfies Criteria 3 of the Justification Test.

**Development PORTRANE**



Criteria 1	Portrane is a small village which lies along the coast, north of Donabate. It is an old established area.
Criteria 2	The zoned lands allow for the development of Portrane. No other lands are available. This area will be the subject of an Urban Framework Plan.
Criteria 3	<p>A detailed site specific FRA is to be carried out and submitted with any planning application to address flood risk, propose mitigation measures and assign appropriate development. Further flood risk assessment will also take place as part of the Urban Framework Plan process.</p> <p>Site Specific FRAs should address the following:</p> <ul style="list-style-type: none"> <li>▪ FRA should address residual risk of increased coastal flood extents under climate change scenarios.</li> <li>▪ Development in Flood Zone A should be either open space or water compatible.</li> <li>▪ FRA should address residual risk of culvert blockage (where applicable), increased flood extents under climate change scenarios and pluvial risk which should be aimed at setting finished floor levels.</li> </ul>
<p><b>Conclusion Pass.</b> It is recommended that any proposals for future development of this land will be subject to a site specific FRA to ensure that development is appropriate and satisfies Criteria 3 of the Justification Test.</p>	

**Development LISSENHALL**



<p>Criteria 1</p>	<p>The lands at Lissenhall, lie immediately to the north of Swords, which is a designated growth area. A LAP will be prepared for the long term strategic development of the area as a planned sustainable mixed use urban district, physically and functionally integrated with Swords. The southern boundary of the zoned lands has been amended to avoid the risk of flooding leaving some minor areas of flood risk within the zoned lands.</p>
<p>Criteria 2</p>	<p>The site is undeveloped but the zoning is considered necessary to provide for the growth of Swords. The area is on the outskirts of the town of Swords and is considered appropriate zoning. A LAP will be prepared for these lands. The LAP will assess and determine the sequencing and phasing of development subject to delivery of the necessary infrastructure, new Metro North and its possible extension. It will also determine an appropriate scale and mix of uses.</p>
<p>Criteria 3</p>	<p>A portion of the zoned lands is at risk. A detailed site specific FRA is to be carried out and submitted with any planning application to address flood risk, propose mitigation measures and assign appropriate development. Further flood risk assessment will also take place as part of the LAP process.</p> <p>Site Specific FRA should address the following:</p> <ul style="list-style-type: none"> <li>▪ Apply sequential approach should be applied through site planning and should avoid encroachment onto, or loss of, the flood plain.</li> <li>▪ Highly Vulnerable Development shall not be permitted in Flood Zone A or B.</li> <li>▪ Development in Flood Zone A should be either open space or water compatible.</li> <li>▪ FRA should address residual risk of culvert blockage (where applicable), increased flood extents under climate change scenarios and pluvial risk which should be aimed at setting finished floor levels.</li> <li>▪ Compensatory storage for development that results in a loss of floodplain must be provided on a level for level basis.</li> </ul>

**Conclusion Pass.** It is recommended that any proposals for future development of this land will be subject to a site specific FRA to ensure that development is appropriate and satisfies Criteria 3 of the Justification Test.

**Development BALHEARY**



<p>Criteria 1</p>	<p>Balheary is an established industrial development area to the north of Swords. It is a long established area. Balheary provides a local employment area where the retention of existing enterprises and the promotion of new local employment opportunities, in conjunction with other uses, will be encouraged, in accordance with the Regional Planning Guidelines. The zoning provides for Mixed Use and will be served by the new Metro North.</p>
<p>Criteria 2</p>	<p>The area is already established with a number of existing premises. The zoning is considered necessary to facilitate the overall zoning which has very good access to the M1, R132 and the centre of Swords. No other lands are available. These lands will be the subject of a Masterplan. The lands will be served by the proposed Metro North.</p>
<p>Criteria 3</p>	<p>A portion of the zoned lands is at risk. A detailed site specific FRA is to be carried out and submitted with any planning application to address flood risk, propose mitigation measures and assign appropriate development. Further flood risk assessment will also take place as part of the Masterplan process.</p> <p>Site Specific FRA should address the following:</p> <ul style="list-style-type: none"> <li>▪ Apply sequential approach should be applied through site planning and should avoid encroachment onto, or loss of, the flood plain.</li> <li>▪ Highly Vulnerable Development shall not be permitted in Flood Zone A or B.</li> <li>▪ Development in Flood Zone A should be either open space or water compatible.</li> <li>▪ FRA should address residual risk of culvert blockage (where applicable), increased flood extents under climate change scenarios and pluvial risk which should be aimed at setting finished floor levels.</li> <li>▪ Compensatory storage for development that results in a loss of floodplain must be provided on a level for level basis and the land given to storage must be land which does not flood in the 1% AEP flood event.</li> </ul>

**Conclusion Pass.** It is recommended that any proposals for future development of this land will be subject to a site specific FRA to ensure that development is appropriate and satisfies Criteria 3 of the Justification Test.

**Development MALAHIDE**



Criteria 1	Malahide is town, situated along the coast, designated in the Regional Planning Guidelines as a Consolidation Area within a Gateway. The lands lie to the north of the village core and includes part of the Marina. The area contains long established dwellings and considered an integral part of the town centre.
Criteria 2	This area is a long established area and the zoning is necessary to provide for some infill development within the existing town boundary.
Criteria 3	<p>Only a small portion of the zoned lands is at risk from the 1% AEP flood event. A detailed site specific FRA is to be carried out and submitted with any planning application to address flood risk, propose mitigation measures and assign appropriate development.</p> <ul style="list-style-type: none"> <li>▪ Apply sequential approach should be applied through site planning and should avoid encroachment onto, or loss of, the flood plain.</li> <li>▪ Highly Vulnerable Development shall not be permitted in Flood Zone A or B.</li> <li>▪ Development in Flood Zone A should be either open space or water compatible.</li> <li>▪ FRA should address residual risk of culvert blockage (where applicable), increased flood extents under climate change scenarios and pluvial risk which should be aimed at setting finished floor levels.</li> <li>▪ Any mitigation measures that may be proposed for this site should be cognisant of the proposals for the Malahide proposed flood relief works.</li> </ul>

**Conclusion Pass.** It is recommended that any proposals for future development of this land will be subject to a site specific FRA to ensure that development is appropriate and satisfies Criteria 3 of the Justification Test.

**Development STREAMSTOWN, MALAHIDE**



<p>Criteria 1</p>	<p>Streamstown is a developing area to the south of Malahide and is the subject of a LAP. On the outskirts of Malahide the zoned lands provides an area to allow for some growth, in accordance with the Regional Planning Guidelines. It has a large number existing dwellings along with a number of sites under construction.</p>
<p>Criteria 2</p>	<p>The area is existing and adjoins the more established area of Malahide, with access onto the Dublin Road. No other lands are available.</p>
<p>Criteria 3</p>	<p>A portion of the zoned lands is at risk. A detailed site specific FRA is to be carried out and submitted with any planning application to address flood risk, propose mitigation measures and assign appropriate development.</p> <p>Site Specific FRAs should address the following:</p> <ul style="list-style-type: none"> <li>▪ Apply sequential approach should be applied through site planning and should avoid encroachment onto, or loss of, the flood plain.</li> <li>▪ Highly Vulnerable Development shall not be permitted in Flood Zone A or B.</li> <li>▪ Development in Flood Zone A should be either open space or water compatible.</li> <li>▪ FRA should address residual risk of culvert blockage (where applicable), increased flood extents under climate change scenarios and pluvial risk which should be aimed at setting finished floor levels.</li> <li>▪ Compensatory storage for development that results in a loss of floodplain within Flood Zone A must be provided on a level for level basis and the land given to storage must be land which does not flood in the 1% AEP flood event.</li> </ul>

**Conclusion Pass.** It is recommended that any proposals for future development of this land will be subject to a site specific FRA to ensure that development is appropriate and satisfies Criteria 3 of the Justification Test.

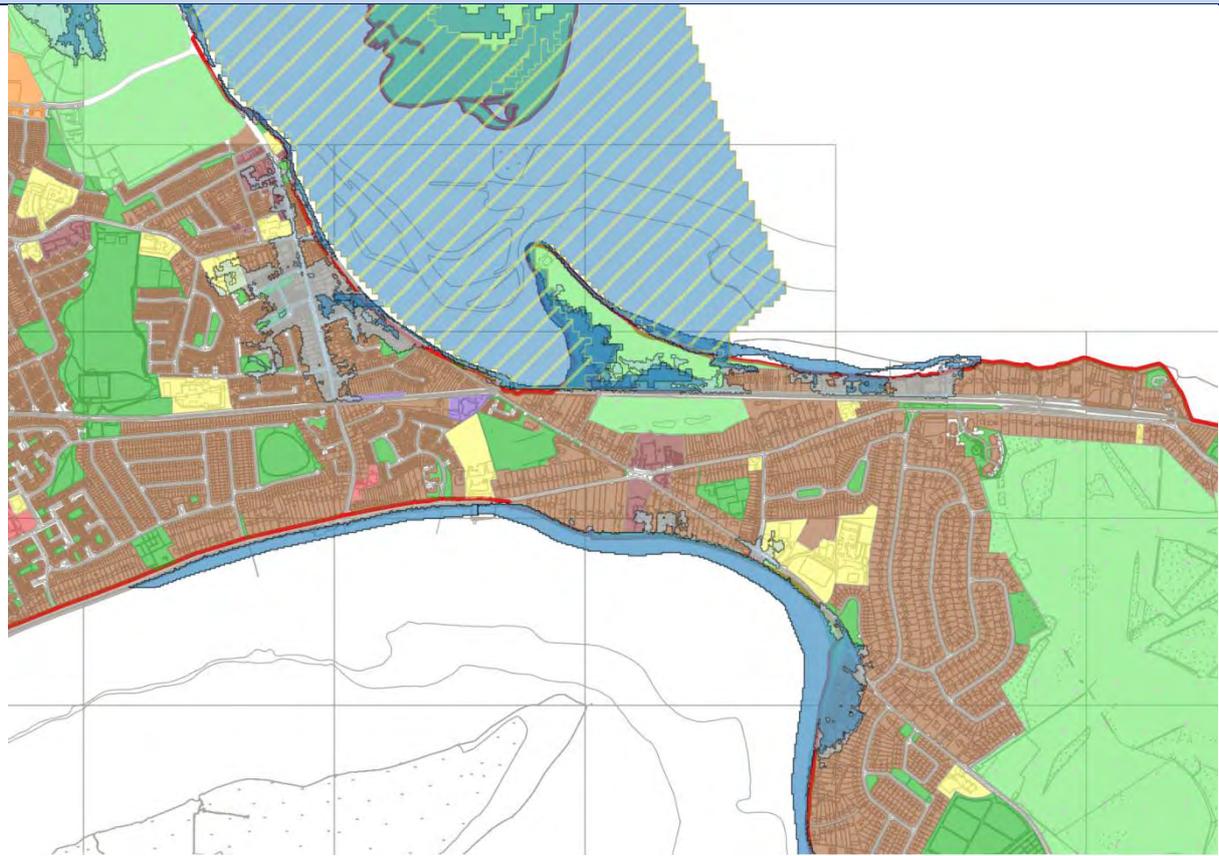
**Development BALGRIFFIN**



Criteria 1	Balgriffin is a newly established area with a large number of existing houses, near the Fingal/Dublin City boundary.
Criteria 2	Much of the remaining site already has planning permission and is currently under construction. No other land is suitable.
Criteria 3	<p>A portion of the zoned lands is at risk. A detailed site specific FRA is to be carried out and submitted with any planning application to address flood risk, propose mitigation measures and assign appropriate development.</p> <p>Site Specific FRAs should address the following:</p> <ul style="list-style-type: none"> <li>▪ Apply sequential approach should be applied through site planning and should avoid encroachment onto, or loss of, the flood plain.</li> <li>▪ Highly Vulnerable Development shall not be permitted in Flood Zone A or B.</li> <li>▪ Development in Flood Zone A should be either open space or water compatible.</li> <li>▪ Any mitigation measures that may be proposed for this site should be cognisant of the proposals for the Balgriffin proposed flood relief works</li> <li>▪ FRA should address residual risk of culvert blockage (where applicable), increased flood extents under climate change scenarios and pluvial risk which should be aimed at setting finished floor levels.</li> </ul>

**Conclusion Pass.** It is recommended that any proposals for future development of this land will be subject to a site specific FRA to ensure that development is appropriate and satisfies Criteria 3 of the Justification Test.

Development HOWTH / BALDOYLE / SUTTON



Criteria 1 Howth / Baldoyle / Sutton are towns located along the coast of Fingal. They are long established communities. The zoning allows for infill development and minor growth within the town.

Criteria 2 The zoning is considered appropriate. There are no other lands available.

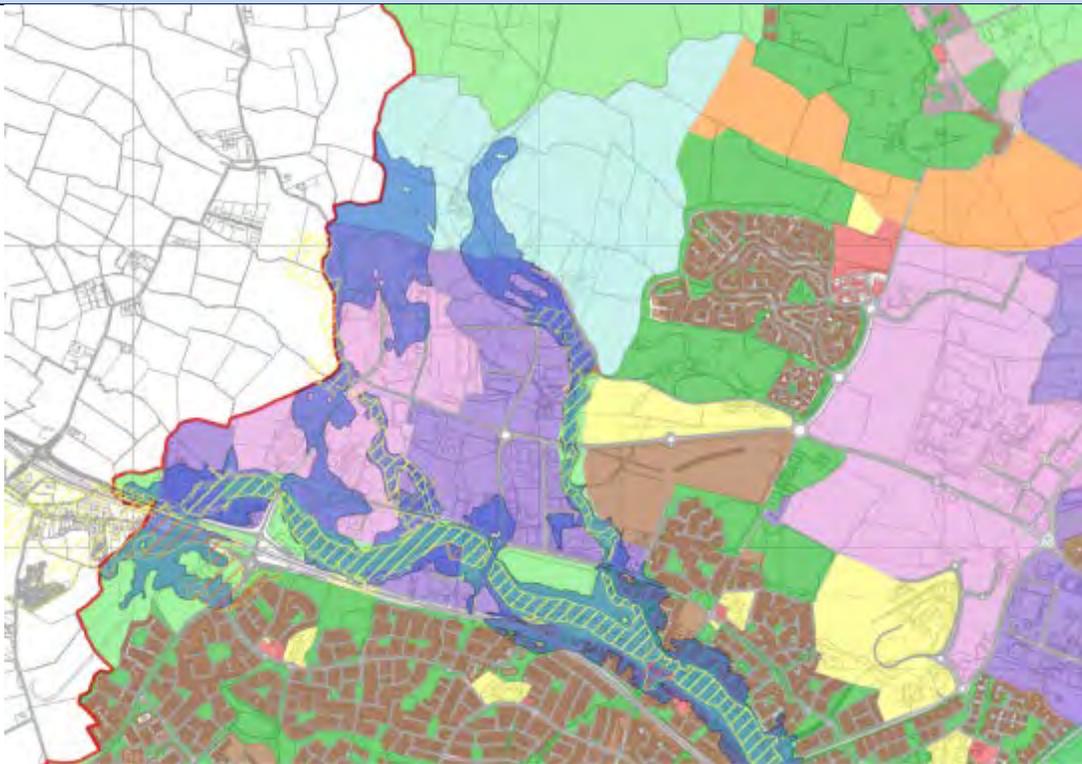
Criteria 3 A portion of the zoned lands is at risk. A detailed site specific FRA is to be carried out and submitted with any planning application to address flood risk, propose mitigation measures and assign appropriate development.

Site Specific FRAs should address the following:

- 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.
- Development in Flood Zone A should be either open space or water compatible.
- Any mitigation measures that may be proposed for this site should be cognisant of the proposals for the Howth proposed flood relief works
- FRA should address residual risk of culvert blockage (where applicable), increased flood extents under climate change scenarios and pluvial risk which should be aimed at setting finished floor levels.

Conclusion **Pass.** It is recommended that any proposals for future development of this land will be subject to a site specific FRA to ensure that development is appropriate and satisfies Criteria 3 of the Justification Test.

**Development DAMASTOWN,MACETOWN and CLONEE**



**Criteria 1** Damastown, Macetown and Clonee is an industrial area to the west of Fingal in the Blanchardstown area. The area provides a local employment area where the retention of existing enterprises and the promotion of new local employment opportunities will be encouraged, in accordance with the Regional Planning Guidelines and has been zoned accordingly.

**Criteria 2** This area is fairly well established and the zoning is necessary to provide for some employment for the local rural population. The area is on the outskirts of Blanchardstown, near the county boundary with Meath. No other lands are available.

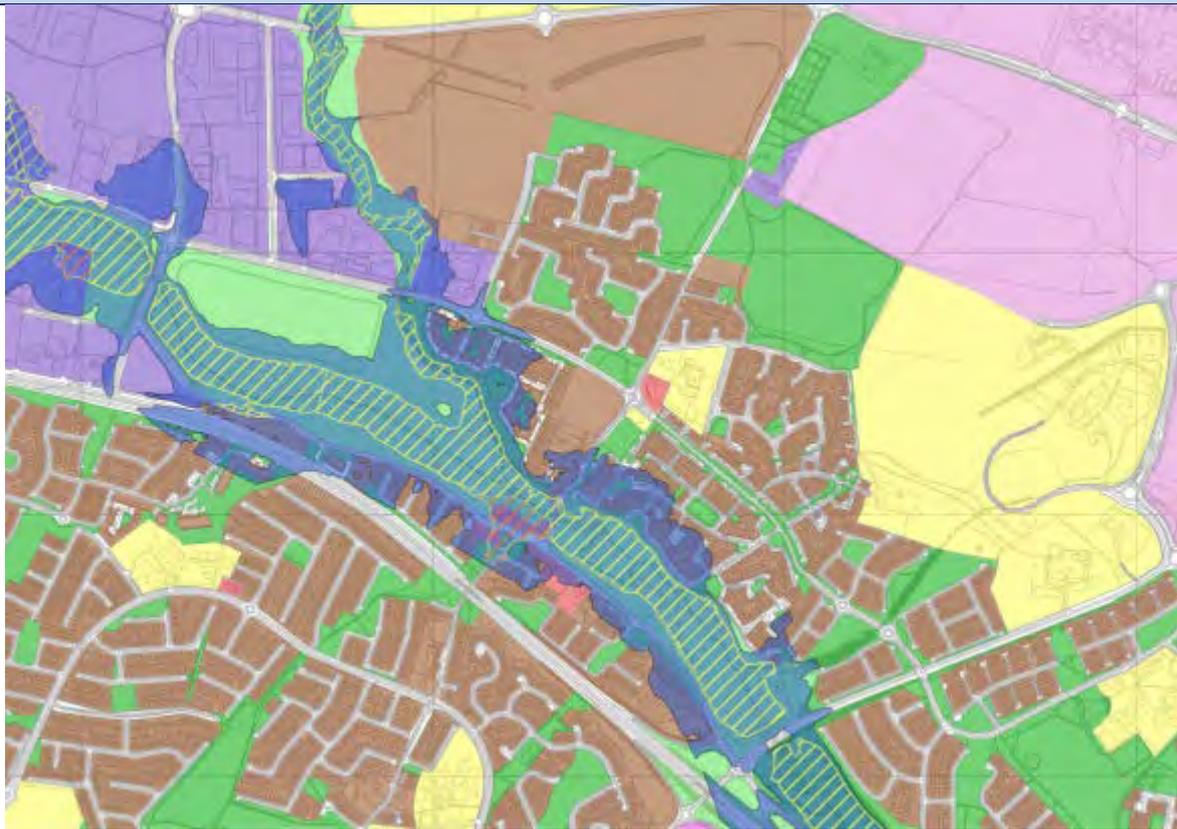
**Criteria 3** Only a small portion of the zoned lands is at risk of flooding in the 1% AEP flood event. The zoning allows for less vulnerable development and any future planning applications will require a detailed site specific flood risk assessment.

Site Specific FRAs should address the following:

- 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 undefended Flood Zone A or B.
- Development in Flood Zone A should be either open space or water compatible.
- FRA should address residual risk of defence failure and increased flood extents under climate change scenarios which should be aimed at setting finished floor levels.
- FRA should address residual risk of culvert blockage (where applicable), increased flood extents under climate change scenarios and pluvial risk which should be aimed at setting finished floor levels.

**Conclusion Pass.** It is recommended that any proposals for future development of this land will be subject to a site specific FRA to ensure that development is appropriate and satisfies Criteria 3 of the Justification Test.

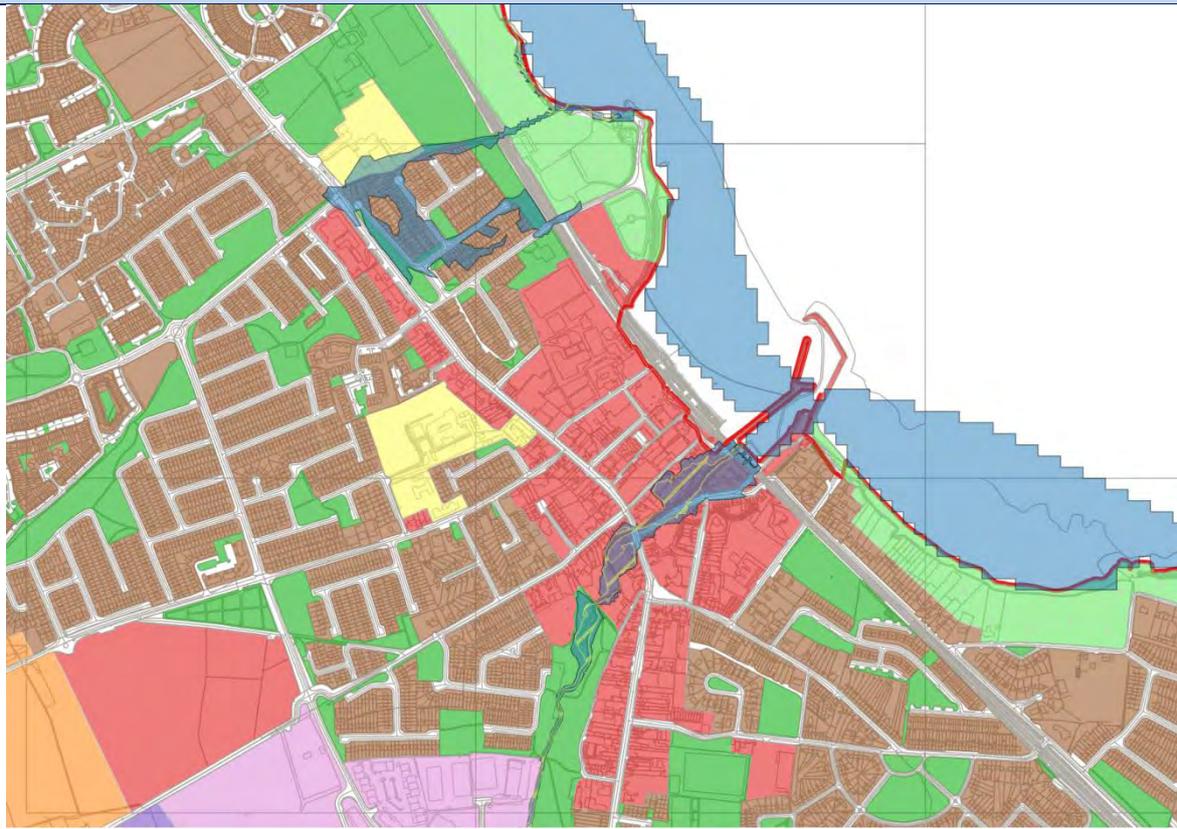
**Development MULHUDDART**



Criteria 1	Mulhuddart is a residential area to the north of Blanchardstown. It is a long established area and fairly well developed.
Criteria 2	The existing zoning remains compatible with the long established use and existing residential developments.
Criteria 3	<p>The Tolka Flood Study identified a number of Flood Mitigation measures which have all been completed giving protection up the 1% AEP flood event. Only a small portion of the zoned lands is at risk. A detailed site specific FRA is to be carried out and submitted with any planning application to address flood risk, propose mitigation measures and assign appropriate development.</p> <p>Site Specific FRAs should address the following:</p> <ul style="list-style-type: none"> <li>▪ Apply sequential approach should be applied through site planning and should avoid encroachment onto, or loss of, the flood plain.</li> <li>▪ Highly Vulnerable Development shall not be permitted in undefended Flood Zone A or B.</li> <li>▪ Development in Flood Zone A should be either open space or water compatible.</li> <li>▪ FRA should address residual risk of defence failure and increased flood extents under climate change scenarios which should be aimed at setting finished floor levels.</li> <li>▪ FRA should address residual risk of culvert blockage (where applicable), increased flood extents under climate change scenarios and pluvial risk which should be aimed at setting finished floor levels.</li> </ul>

**Conclusion Pass.** It is recommended that any proposals for future development of this land will be subject to a site specific FRA to ensure that development is appropriate and satisfies Criteria 3 of the Justification Test.

**Development BALBRIGGAN**



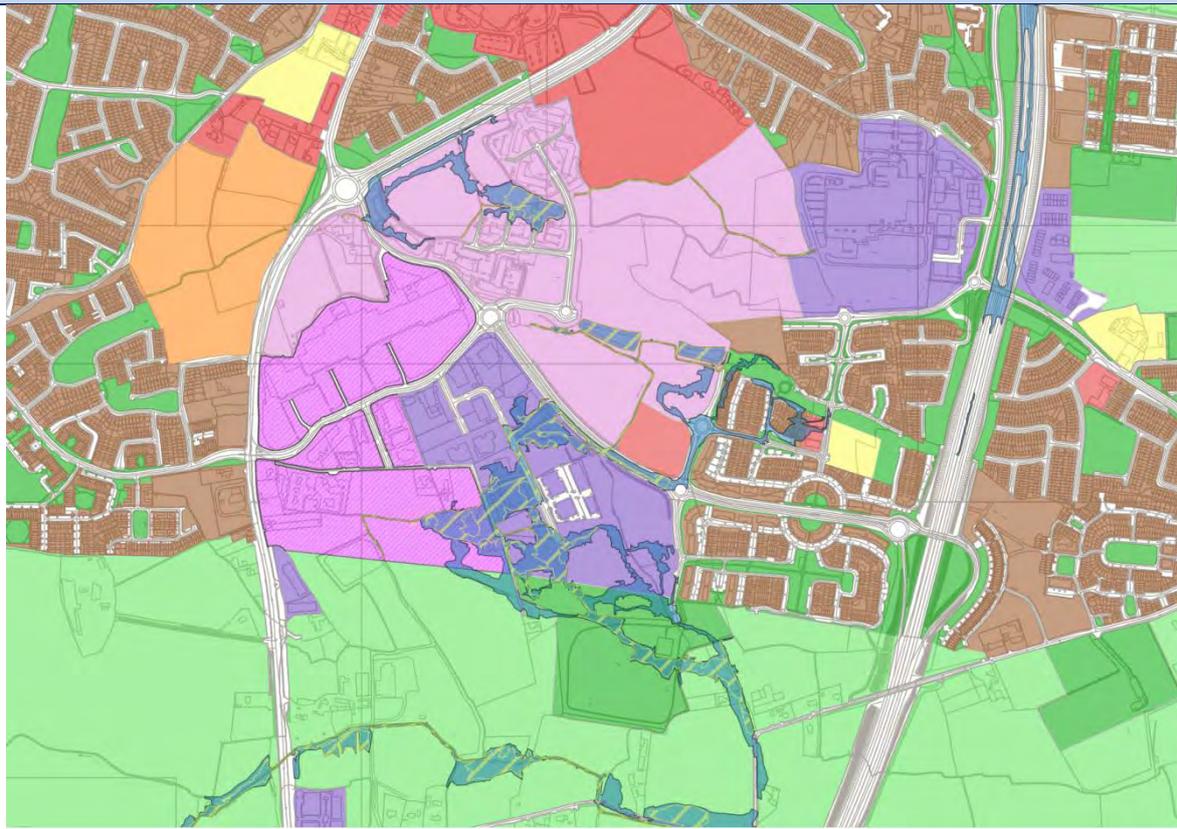
Criteria 1	Balbriggan is a coastal town in the north of the county It is a long established area and fairly well developed.
Criteria 2	The existing zoning remains compatible with the long established use and existing residential developments.
Criteria 3	<p>A portion of the zoned lands is at risk. A detailed site specific FRA is to be carried out and submitted with any planning application to address flood risk, propose mitigation measures and assign appropriate development. Further flood risk assessment will also take place as part of the Masterplan process.</p> <p>Site Specific FRA should address the following:</p> <ul style="list-style-type: none"> <li>▪ Apply sequential approach should be applied through site planning and should avoid encroachment onto, or loss of, the flood plain.</li> <li>▪ Highly Vulnerable Development shall not be permitted in Flood Zone A or B.</li> <li>▪ Development in Flood Zone A should be either open space or water compatible.</li> <li>▪ FRA should address residual risk of culvert blockage (where applicable), increased flood extents under climate change scenarios and pluvial risk which should be aimed at setting finished floor levels.</li> <li>▪ Compensatory storage for development that results in a loss of floodplain must be provided on a level for level basis s and the land given to storage must be land which does not flood in the 1% AEP flood event.</li> </ul>
<p><b>Conclusion Pass.</b> It is recommended that any proposals for future development of this land will be subject to a site specific FRA to ensure that development is appropriate and satisfies Criteria 3 of the Justification Test.</p>	

**Development SANTRY CLOSE**



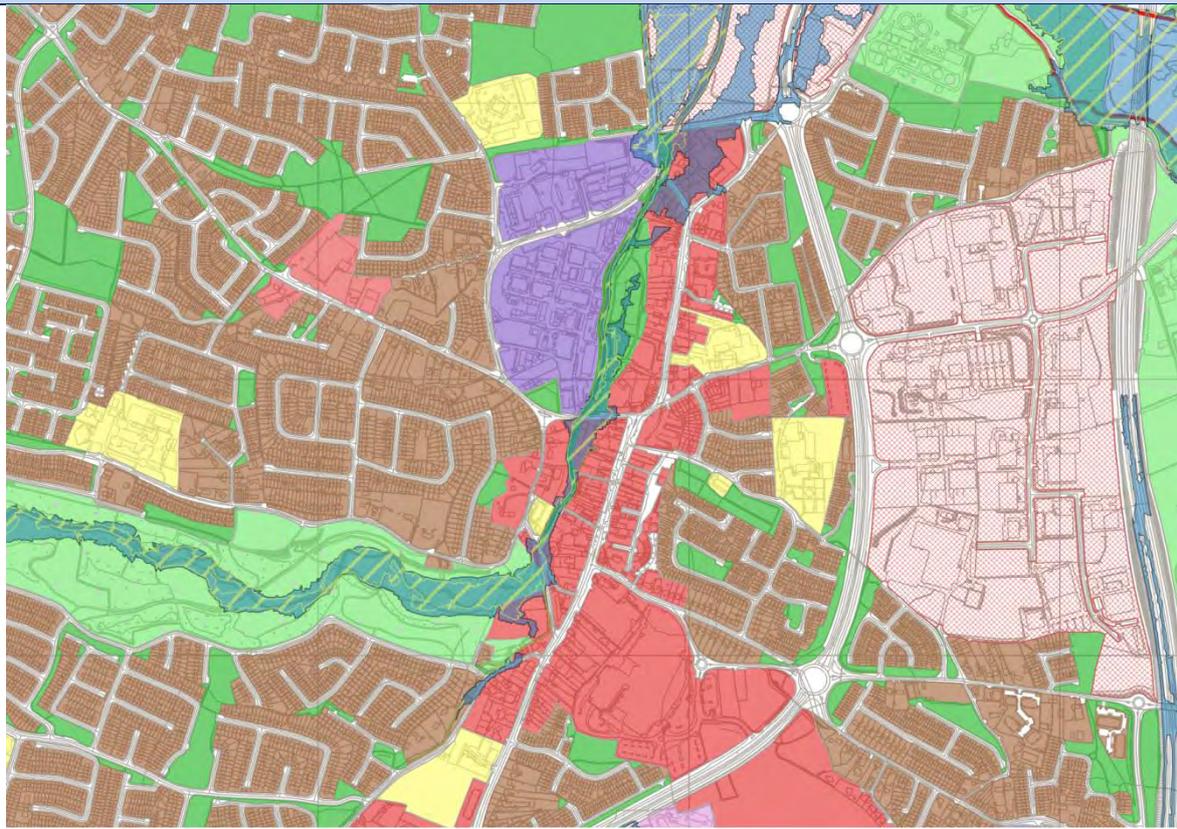
Criteria 1	Santry is a residential area to the south of the airport. It is a long established area and fairly well developed
Criteria 2	The existing zoning remains compatible with the long established use and existing residential developments.
Criteria 3	<p>A portion of the zoned lands is at risk. A detailed site specific FRA is to be carried out and submitted with any planning application to address flood risk, propose mitigation measures and assign appropriate development. Further flood risk assessment will also take place as part of the Masterplan process.</p> <p>Site Specific FRA should address the following:</p> <ul style="list-style-type: none"> <li>▪ Apply sequential approach should be applied through site planning and should avoid encroachment onto, or loss of, the flood plain.</li> <li>▪ Highly Vulnerable Development shall not be permitted in Flood Zone A or B.</li> <li>▪ Development in Flood Zone A should be either open space or water compatible.</li> <li>▪ FRA should address residual risk of culvert blockage (where applicable), increased flood extents under climate change scenarios and pluvial risk which should be aimed at setting finished floor levels.</li> <li>▪ Compensatory storage for development that results in a loss of floodplain must be provided on a level for level basis and the land given to storage must be land which does not flood in the 1% AEP flood event.</li> </ul>
<p><b>Conclusion Pass.</b> It is recommended that any proposals for future development of this land will be subject to a site specific FRA to ensure that development is appropriate and satisfies Criteria 3 of the Justification Test.</p>	

**Development AIRSIDE RETAIL PARK**



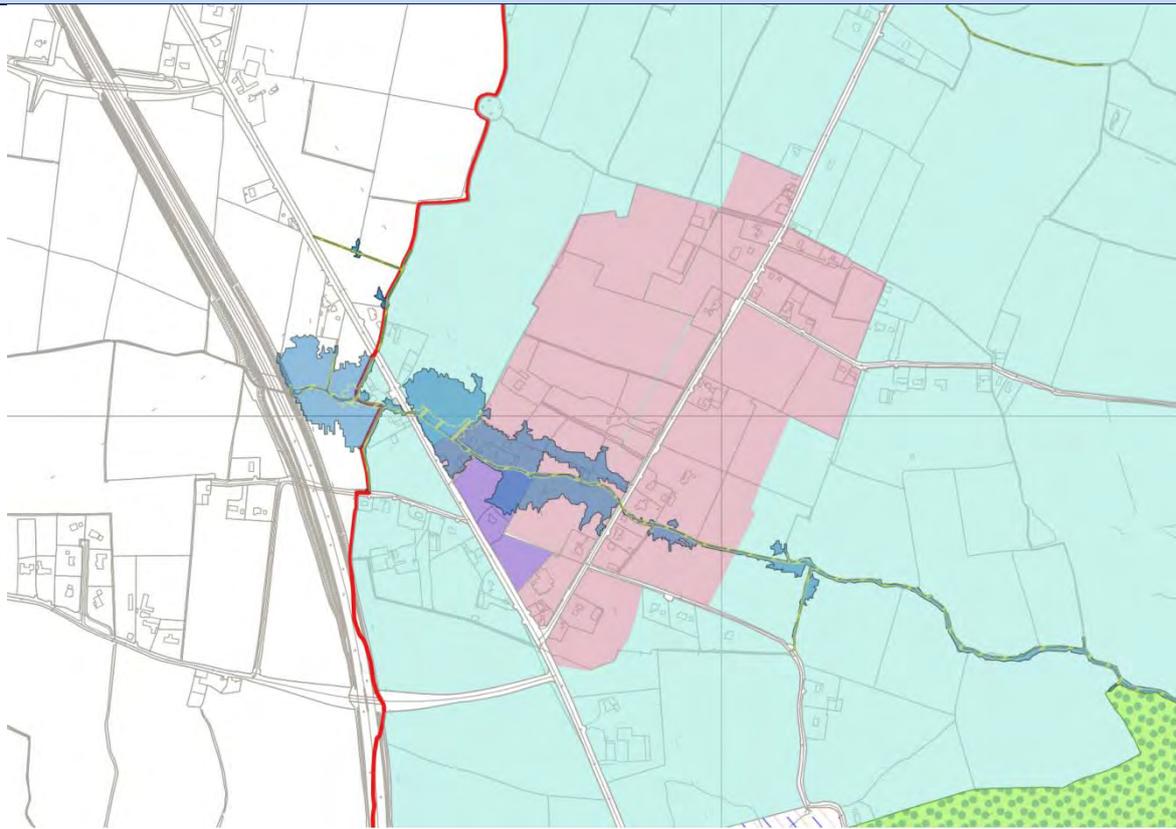
Criteria 1	Airside retail park is a commercial and industrial area to the south of Swords town. It is a long established area and fairly well developed
Criteria 2	The existing zoning remains compatible with the long established use and existing residential developments.
Criteria 3	<p>A portion of the zoned lands is at risk. A detailed site specific FRA is to be carried out and submitted with any planning application to address flood risk, propose mitigation measures and assign appropriate development. Further flood risk assessment will also take place as part of the Masterplan process.</p> <p>Site Specific FRA should address the following:</p> <ul style="list-style-type: none"> <li>▪ Apply sequential approach should be applied through site planning and should avoid encroachment onto, or loss of, the flood plain.</li> <li>▪ Highly Vulnerable Development shall not be permitted in Flood Zone A or B.</li> <li>▪ Development in Flood Zone A should be either open space or water compatible.</li> <li>▪ FRA should address residual risk of culvert blockage (where applicable), increased flood extents under climate change scenarios and pluvial risk which should be aimed at setting finished floor levels.</li> <li>▪ Compensatory storage for development that results in a loss of floodplain must be provided on a level for level basis and the land given to storage must be land which does not flood in the 1% AEP flood event.</li> </ul>
<p><b>Conclusion Pass.</b> It is recommended that any proposals for future development of this land will be subject to a site specific FRA to ensure that development is appropriate and satisfies Criteria 3 of the Justification Test.</p>	

**Development SWORDS TOWN**



Criteria 1	Swords is the county town of Fingal and it is a long established area and very well developed.
Criteria 2	The existing zoning remains compatible with the long established use and existing residential developments.
Criteria 3	<p>A portion of the zoned lands is at risk. A detailed site specific FRA is to be carried out and submitted with any planning application to address flood risk, propose mitigation measures and assign appropriate development. Further flood risk assessment will also take place as part of the Masterplan process.</p> <p>Site Specific FRA should address the following:</p> <ul style="list-style-type: none"> <li>▪ Apply sequential approach should be applied through site planning and should avoid encroachment onto, or loss of, the flood plain.</li> <li>▪ Highly Vulnerable Development shall not be permitted in Flood Zone A or B.</li> <li>▪ Development in Flood Zone A should be either open space or water compatible.</li> <li>▪ FRA should address residual risk of culvert blockage (where applicable), increased flood extents under climate change scenarios and pluvial risk which should be aimed at setting finished floor levels.</li> <li>▪ Compensatory storage for development that results in a loss of floodplain must be provided on a level for level basis and the land given to storage must be land which does not flood in the 1% AEP flood event.</li> </ul>
<p><b>Conclusion Pass.</b> It is recommended that any proposals for future development of this land will be subject to a site specific FRA to ensure that development is appropriate and satisfies Criteria 3 of the Justification Test.</p>	

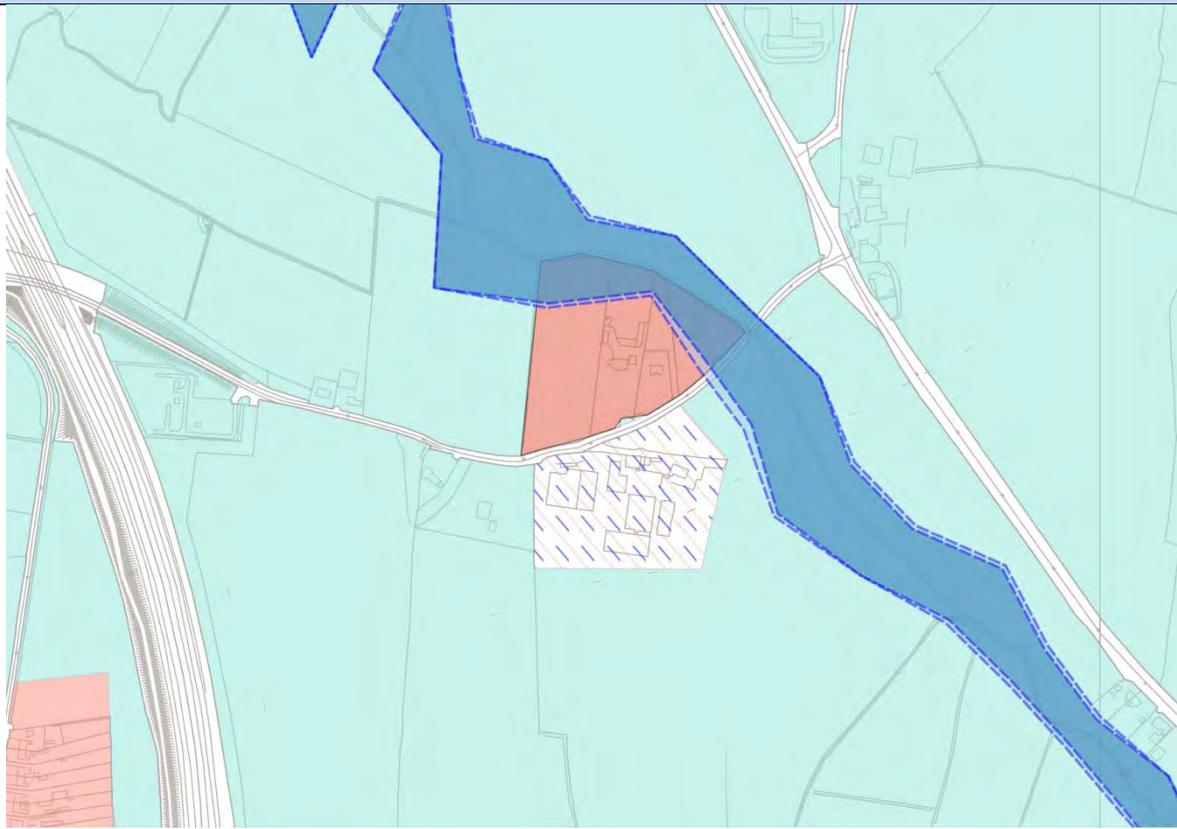
**Development COOLQUAY**



<p>Criteria 1</p>	<p>Coolquay is a linear settlement located in a rural area focused on the junction of the R135 and the R130. It is a commuter village in the Metropolitan Area. A Local Area Plan will be prepared for this village within the lifetime of the Development Plan.</p>
<p>Criteria 2</p>	<p>Given its status as a commuter village, within the Metropolitan Area, the level of growth must be carefully managed to ensure a vibrant sustainable community through the Local Area Plan process. A Local Area Plan will be prepared for this village within the lifetime of the Development Plan.</p>
<p>Criteria 3</p>	<p>A portion of the zoned lands is at risk. A detailed site specific FRA is to be carried out and submitted with any planning application to address flood risk, propose mitigation measures and assign appropriate development. Further flood risk assessment will also take place as part of the Masterplan process.</p> <p>Site Specific FRA should address the following:</p> <ul style="list-style-type: none"> <li>▪ Apply sequential approach should be applied through site planning and should avoid encroachment onto, or loss of, the flood plain.</li> <li>▪ Highly Vulnerable Development shall not be permitted in Flood Zone A or B.</li> <li>▪ Development in Flood Zone A should be either open space or water compatible.</li> <li>▪ FRA should address residual risk of culvert blockage (where applicable), increased flood extents under climate change scenarios and pluvial risk which should be aimed at setting finished floor levels.</li> <li>▪ Compensatory storage for development that results in a loss of floodplain must be provided on a level for level basis and the land given to storage must be land which does not flood in the 1% AEP flood event.</li> </ul>

**Conclusion Pass.** It is recommended that any proposals for future development of this land will be subject to a site specific FRA to ensure that development is appropriate and satisfies Criteria 3 of the Justification Test.

**Development BALLOUGH**



Criteria 1	Ballough-Lusk, a proposed new Rural Cluster is located to the west of Lusk and north of the existing Ballough RB. The lands are currently zoned RU. The lands access onto a county road which is in close proximity to the junction with the R132 Regional Road to Balbriggan.
Criteria 2	The zoning is considered appropriate.
Criteria 3	<p>A portion of the zoned lands has been identified at risk using PFRA flood extents. A detailed site specific FRA is to be carried out and submitted with any planning application to address flood risk, propose mitigation measures and assign appropriate development. Further flood risk assessment will also take place as part of the Masterplan process.</p> <p>Site Specific FRA should address the following:</p> <ul style="list-style-type: none"> <li>▪ Apply sequential approach should be applied through site planning and should avoid encroachment onto, or loss of, the flood plain.</li> <li>▪ Highly Vulnerable Development shall not be permitted in Flood Zone A or B.</li> <li>▪ Development in Flood Zone A should be either open space or water compatible.</li> <li>▪ FRA should address residual risk of culvert blockage (where applicable), increased flood extents under climate change scenarios and pluvial risk which should be aimed at setting finished floor levels.</li> <li>▪ Compensatory storage for development that results in a loss of floodplain must be provided on a level for level basis and the land given to storage must be land which does not flood in the 1% AEP flood event.</li> </ul>

**Conclusion Pass.** It is recommended that any proposals for future development of this land will be subject to a site specific FRA to ensure that development is appropriate and satisfies Criteria 3 of the Justification Test.



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