# KILMARTIN LOCAL AREA PLAN,

# 2012 - 2018

## Strategic Flood Risk Assessment

**October 2012**

DBFL Consulting Engineers

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## APPENDICES

# 1.0 INTRODUCTION

## 1.1 Background

DBFL Consulting Engineers were commissioned by Fingal County Council to develop a Strategic Flood Risk Assessment (SFRA) for the proposed Kilmartin Local Area Plan (LAP) 2012-2018, in Tyrellstown, Dublin 15. The LAP will set out the local land use and planning policy for the Kilmartin area and provide an updated strategy on how the lands should be developed and managed in a sustainable way to meet the needs of its residents.

## 1.2 Objectives

The objectives of this report are to inform the Kilmartin LAP regarding the constraints, conclusions and recommendations regarding flood risk for the potential development of the lands. The report will assess the LAP lands in accordance the requirements of "*The Planning System and Flood Risk Management Guidelines for Planning Authorities"*.

The report will provide the following;

- An improved understanding of flood risk within the Kilmartin LAP.
- Identification of areas of natural floodplain.
- A detailed flood risk assessment with flood risk category maps.
- Identify areas where the sequential and justification tests will apply.
- Identify how surface water should be managed.

## 1.3 Flood Risk Assessment Scope

This SFRA relates only to the proposed Kilmartin LAP lands and its immediate surroundings. This report uses information obtained from various sources, together with flood analysis of the local watercourses to assess flood risk in the vicinity of the lands. The report follows the requirements of '*The Planning System & Flood Risk Management – Guidelines for Planning Authorities',* (referred to as the *Guidelines* for the remainder of this report).

## 1.4 Approach

Chapter 2 of this report considers '*The Planning System & Flood Risk Management – Guidelines for Planning Authorities'* as they relate to the proposed LAP lands.

Flood risk identification is presented in Chapter 3 and initial flood risk assessment in Chapter 4. A more detailed assessment of specific flood risk and residual risk relating to the proposed Kilmartin LAP is presented Chapter 5. Conclusions and recommendations are presented in Chapter 6.

## 1.5 Existing Site

The Kilmartin LAP lands, approximately 78.5 hectares (circa 194 acres), are located adjacent to Tyrellstown and to the north of Blanchardstown, see figure 1.1. They currently consist primarily of farmland which is drained by a system of drainage ditches. The existing R121 regional road (Church Road) cuts through the centre of the LAP lands and skirts its north-eastern boundary before connecting to the Ratoath Road.

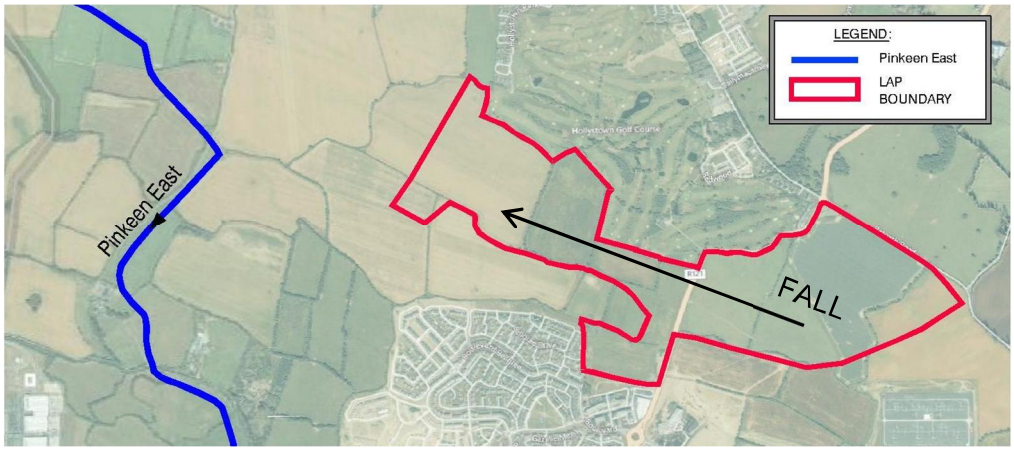



Figure 1.1 - Kilmartin LAP Lands, Tyrellstown, Dublin

Topographical surveys of the area indicate that the Kilmartin LAP lands mainly fall from east to west from a high point of c.84m to c.68m i.e. towards the Pinkeen East tributary.

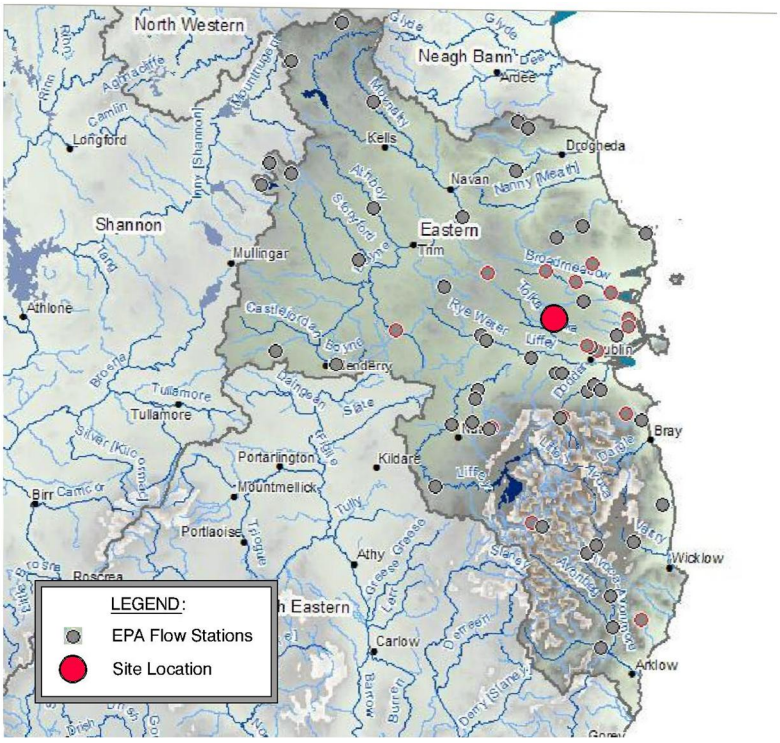



Figure 1.2 - Principal Rivers, Eastern River Basin District

The nearest EPA designated water courses are the Pinkeen and the Pinkeen East (Mooretown and Powerstown watercourses). The Site is within the Eastern River Basin District, the Tolka Water Management Unit and the Liffey and Dublin Bay Hydrometric Area. The coast is approximately 13km to the south east.

## 1.6 Proposed Development

The Fingal County development Plan zones the Kilmartin LAP lands as the following categories;

- 'RA' zoned lands – "to provide for new residential communities in accordance with approved local area plans and subject to the provision of the necessary social and physical infrastructure".
- 'LC' zoned lands – "to protect, provide for and/or improve local centre facilities".

The proposed development framework for the Kilmartin LAP is shown in Appendix A. The total zoning consists of the following:

- c.40.5 hectares of 'RA' zoned land east of the R121 and subject to 20 housing units per hectare restriction;
- c.32 hectares of 'RA' zoned land west of the R121;
- c.6.1 hectares of 'LC' zoned land north of the existing Tyrellstown local centre;

The R121 divides the zoned residential community lands (RA) lands into two parcels to the east and west. Residential areas will be divided into zones of differing housing density, with remaining areas to include a primary school, a secondary school and parklands. Access to the lands will be provided from the existing Ratoath Road and the future N2/N3 Link Road currently under construction. New avenues, 'green infrastructure' links and Local Centre links will combine with the existing R121 to provide for pedestrian, cycle and vehicle access within the Kilmartin LAP lands.

# 2.0 Planning System & Flood Risk Management Guidelines

## 2.1 General

"*The Planning System and Flood Risk Management Guidelines for Planning Authorities",* November 2009 and its Technical Appendices outline the requirements for a strategic flood risk assessment, see figure 2.1 below.

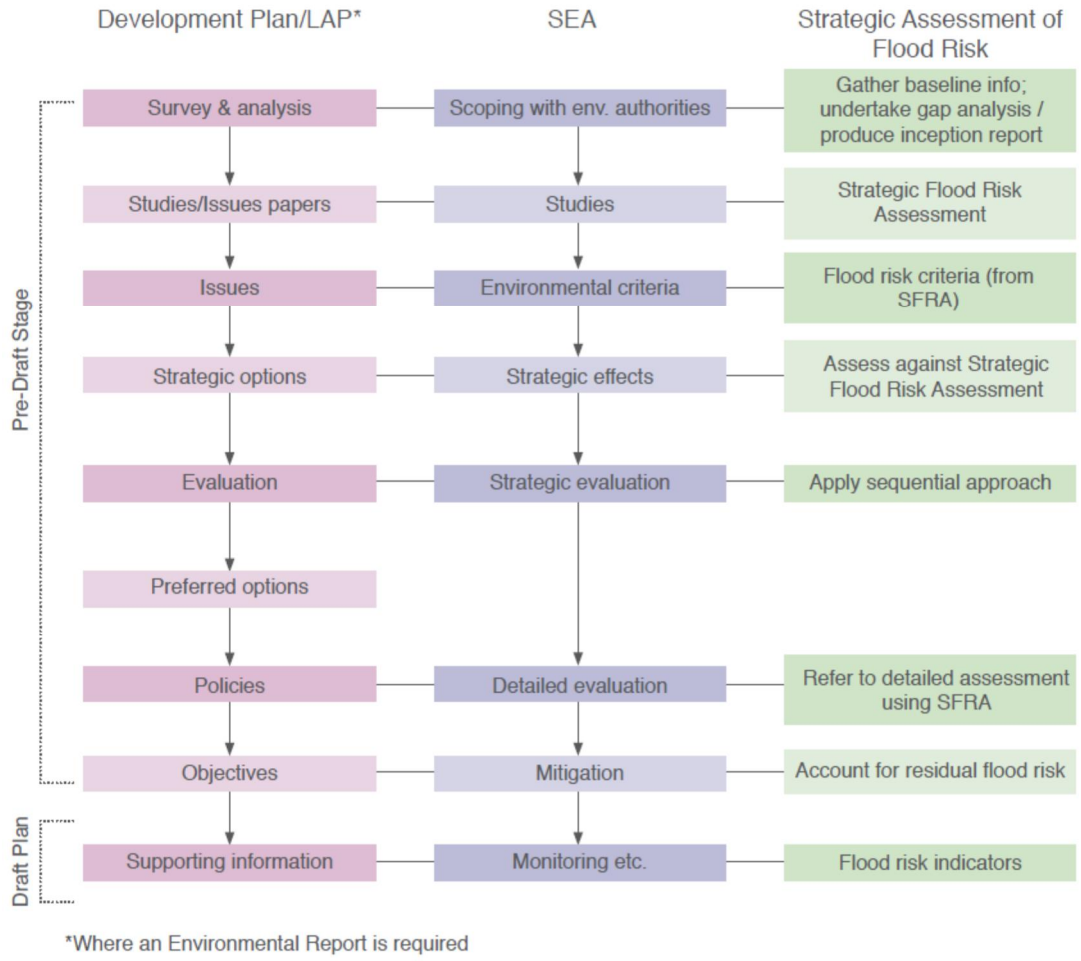



Figure 2.1 – Development Plan/LAP preparation with Strategic Flood Risk Assessment

## 2.2 Flood Risk Assessment Stages

Flood risk is normally assessed by a flood risk identification stage followed by an initial flood risk assessment and then a more detailed flood risk assessment stage.

# 3.0 Flood Risk Identification Stage

## 3.1 General

The initial flood risk identification stage using existing information to identify and confirm whether there may be flooding or surface water management issues for the lands that may warrant further investigation.

## 3.2 Information Sources Consulted

Information sources consulted for the identification exercise are outlined in table 3.1 below.

| Information Source | Comments |
|---|---|
| Predictive and historic flood maps, and Benefiting Lands Maps, such as those at http://www.floodmaps.ie; | OPW www.floodmaps.ie website consulted. |
| Expert advice from OPW who may be able to provide reports containing the results of detailed modelling and flood-mapping studies, including critical drainage areas, and information on historic flood events, including flooding from all sources; | Historic flood hazard maps and info obtained from OPW's floodmaps.ie website & River Tolka Flooding Study by RPS |
| Predictive fluvial & tidal flood maps; | Draft PFRA flood extents map consulted. ICPPS coastal flood extents maps consulted. |
| Previous Strategic Flood Risk Assessments; | Eastern CFRAM Study. |
| Topographical maps, in particular digital elevation models produced by aerial survey or ground survey techniques; | OSI Maps consulted & Site topographic survey undertaken. |
| Information on flood defence condition and performance; | No flood defence information available. No defences in LAP lands. |
| Alluvial deposit maps of the Geological Survey of Ireland (which would allow the potential for the implementation of source control and infiltration techniques, groundwater and overland flood risk to be assessed). These maps, while not providing full coverage, can indicate areas that have flooded in the past (the source of the alluvium) and may be particularly useful at the early stages of the FRA process where no other information is available; | GSI maps consulted. |
| Walkover survey to assess potential sources of flooding, likely routes for flood waters and the site's key features, including flood defences; and | Walkover survey conducted. |
| National, regional & local spatial plans, such as the National Spatial Strategy, regional planning guidelines, development plans & local area | Fingal County Council Development Plan consulted. |

| | |
|---|---|
| plans provide key information on existing and potential future receptors. | |
| Local Information & Local Libraries | Locals consulted |
| 'Liable to flood' markings on the old '6 Inch' maps; | Historic OSI maps consulted. |
| Consultation with Local Authority | Fingal County Council Drainage Department consulted. |

*Table 3.1 - Information sources consulted*

### 3.2.1 OPW Predictive, Historic & Benefiting Lands Maps & Flood Hazard Information

From consultation of the OPW website www.floodmaps.ie there were no OPW land commission schemes or benefitting lands zones within the LAP lands although some benefitting lands are identified to the north-west of the site; see Appendix B for website report. The report also identifies the main rivers for the area.

The OPW floodmaps.ie report for the area also highlighted previous flood events mostly relating to the Tolka e.g. 1954, 1965, 1968, 1986, 2002 and 2005 into which the Pinkeen flows. None of these flood events were identified as having caused flooding within the LAP lands. The nearest flood event recorded was on the Pinkeen West at Folistown, this is a regularly occurring event that floods the road when the river breaks its banks.

The 2002 Tolka flood event, which caused widespread flooding along its length, was studied in detail by RPS and their findings published in a report titled "River Tolka Flooding Study", 2003. This report mapped and modelled the 2002 flood events however the LAP lands were outside the mapped flood extents which only extended to the Pinkeen at Damastown, see Appendix C. (The 2002 event roughly corresponds to a 1 in 100 year (1%AEP) fluvial flood event.)

### 3.2.2 Previous Strategic Flood Risk Assessments & Predictive Flood Maps

As part of the EU Floods Directive, the OPW is undertaking a Catchment Flood Risk Assessment and Management (CFRAM) Study. An initial part of this Study was a national Preliminary Flood Risk Assessment (PFRA) to identify areas at risk of significant flooding. The PFRA report and maps are available at www.cfram.ie and identify areas deemed to be at risk of flooding (referred to as Areas for Further Assessment, or 'AFAs'), as they require more detailed assessment on the extent and degree of flood risk by the later CFRAM Studies.

The PFRA map for north-west Dublin is reproduced in Appendix D for the area of the Kilmartin LAP. This also identifies the main rivers for the area and shows that there is potential for some flooding in corridors along the route of the Pinkeen East and West.

The extents of fluvial flooding may impact the east of the LAP lands and therefore further detailed assessment is required. (It should be noted that the PFRA map does not take into account detailed topography, flood defences or walls or barriers to flooding which may protect against or reduce flood risk. These will be considered in the initial flood risk assessment stage).

The OPW also undertook an Irish Coastal Protection Strategy Study (ICPSS) which produced coastal/tidal flood extents maps, including Dublin, for 0.1% and 0.5%AEP tidal flood levels, see Appendix E. The map indicates that the site is over 10km from the edge of the coastal/tidal flood extents zone.

The Eastern CFRAM project was awarded in 2011 and will not conclude until 2015; as such final detailed flood risk maps and flood risk categories are not currently available.

The Fingal East Meath CFRAM study has produced flood extents maps for the Ward River, located immediately to the north of the LAP lands. These do not impact the LAP lands as they relate to a different catchment.

Dublin City Council has also been implementing the recommendations from the Tolka Flood Study to provide protection to those areas at risk of fluvial flooding, although works have been conducted at Mulhuddart, there were none identified along the Pinkeen.

### 3.2.3 Previous Drainage Studies

As the lands are undeveloped agricultural land they are outside the extents of the surface water pipework network studied by previous Greater Dublin Strategic Drainage Study (GDSDS).

### 3.2.4 Other Sources

Other information sources were consulted to determine if there was any additional flood risk to the LAP lands, these included;

- Topographical surveys of the area – (refer to drawings in Appendix F).
- Flood defences Information.
- Soil data from EPA and GSI – (refer to Strategic SUDS Report for details).
- Groundwater information from GSI – (refer to Strategic SUDS Report for details).
- Walkover survey
- Development Plan & Local Area plan – (refer to report section 1.6).
- Existing Local Authority Drainage Records
- Consultation with Local Authority

- Local Information
- Historic Maps

None of the 'other sources' above indicated evidence of flood risk to the Kilmartin LAP lands although a number of drainage ditches within the boundary were observed which aid in the drainage and transfer of run-off to the Pinkeen East watercourse. In relation to groundwater, there was no evidence that the bedrock or soils are susceptible to rising groundwater that would cause flooding problems.

## 3.3 Source-Pathway-Receptor Model

A Source-Pathway-Receptor model was produced to summarize the possible sources of floodwater, the people and assets (receptors) that could be affected by potential flooding (with specific reference to the proposals) and the pathways by which flood water for a 0.1%AEP (Annual Exceedance Probability) and 1%AEP storms could reach the receptors, see table 3.1. It provides the probability and magnitude of the sources, the performance and response of pathways and the consequences to the receptors in the context of the LAP development proposals. These sources, pathways and receptors will be assessed further by the initial flood risk assessment stage.

| Source | Pathway | Receptor | Likelihood | Consequence | Risk |
|---|---|---|---|---|---|
| Tidal | Tidal flooding from coast 13km away via Tolka River. | | Remote | | |
| Fluvial | Overbank from Pinkeen Rivers, 300m to the west. | Low lying areas of the LAP lands. | Possible | Medium | Moderate |
| Surface Water Drainage (Pluvial) | Flooding from future development's surcharging drainage systems | Schools, homes and roads within the lands. | Possible | Medium | Moderate |
| Groundwater flooding | Rising GWL | Low lying LAP lands | Remote | Low | Low |
| Human or Mechanical Error (Pluvial) | New drainage network blocks | Areas draining to the surface water network | Possible | Medium | Moderate |

*Table 3.1 - Source-pathway-receptor analysis*

# 4.0 Initial Flood Risk Assessment Stage

The main flood risks to the Kilmartin LAP lands identified from the Stage 1 exercise were fluvial and pluvial flooding, these are assessed further below.

## 4.1.1 Initial Fluvial Flood Risk Assessment

The PFRA flood extents map identified that part of the eastern LAP lands may be susceptible to fluvial flood risk. To study this and the existing watercourses in the LAP lands further, a HEC-RAS hydraulic model of the Pinkeen West catchment was constructed to identify the extents of flooding for 1%AEP and 0.1%AEP return events with an allowance of 20% for climate change. This also took account of actual watercourse cross-sections and more detailed topographic survey information, refer to Hydraulic Report for details. These were then used to produce flood zone category maps for the LAP, see Appendix F.

The types of proposed development suitable for the zones A, B and C are outlined in table 3.2 below from the Guidelines.

| | Flood Zone A | Flood Zone B | Flood Zone C |
|---|---|---|---|
| Highly vulnerable development (including essential infrastructure) | Justification Test | Justification Test | Appropriate |
| Less vulnerable development | Justification Test | Appropriate | Appropriate |
| Water-compatible development | Appropriate | Appropriate | Appropriate |

*Table 3.2 - Matrix of vulnerability versus flood zone to illustrate appropriate development and that required to meet the Justification Test*

The various types of development proposed for the LAP lands are categorised as follows;

- Residential – Highly Vulnerable.
- Commercial – Less Vulnerable
- Schools – Highly Vulnerable.
- Roads/Local transport infrastructure – Less Vulnerable.
- Open Space – Water compatible.

### 4.1.2 Initial Pluvial Flood Risk Assessment

The Source-Pathway-Receptor model identified that there could be potential for pluvial flood risk within the LAP lands related to future drainage networks to serve the proposed development. This has potential to cause local flooding unless drainage is designed in accordance with the regulations e.g. GDSDS and to take account of flood exceedence e.g. for storms return periods over 1%AEP.

To address pluvial flood risk concerns and to enable a co-ordinated and common approach to surface water management for the LAP lands a Sustainable Urban Drainage System (SUDS) Strategy for the Kilmartin LAP has been produced which outlines the proposed strategy for surface water drainage and implementation of SUDS for the lands. The SUDS strategy also details operation and maintenance procedures which should be implemented to reduce the risk of human or mechanical error causing pluvial flood risk resulting from blockages.

# 5.0 Detailed Flood Risk Assessment Stage

## 5.1 General

The detailed flood risk assessment stage will consider the following;

- Detailed assessment of flooding sources identified from the Initial Flood Risk Identification Stage.
- Identify proposed development in relation to Flood Zone Categories A and B.
- Identify areas of natural floodplain to be protected.
- Implications of flood risk on critical infrastructure.
- Identify areas where site specific flood risk assessments will be required for development.
- Assessment of the proposed surface water management and SUDS provision including exceedence.
- Potential impacts of climate change.

## 5.2 Detailed Fluvial Flood Risk Assessment

Following a detailed hydraulic analysis of the Pinkeen East catchment using HEC-RAS modelling software, refer to Hydraulic Analysis Report, it was apparent that flooding up to a 1000 year return event is mostly contained to the existing channels within the LAP lands. The hydraulic analysis did identify some flooding, up to 60m in width, immediately to the west of the Kilmartin LAP lands in agricultural lands, for the 100 years and 1000 years return events.

The flood extents from the HEC-RAS model were used to develop the Flood Zone Categories A, B and C for the LAP lands, see Appendix F. These reveal that the majority of the lands are in zone C except for the existing drainage channels/ditches/watercourses which are subject to flooding within a narrow strip alongside the channel. These provide natural storage of run-off as well as conveyance capacity.

It is recommended that the natural drainage courses are retained within the LAP lands and protected from development. They should be incorporated into the drainage and surface water management strategy for the LAP lands – refer to the Strategic SUDS report for further details.

These watercourses may be impacted at locations where roads cross them, as such these crossings should be designed to ensure that they are compatible with required conveyance, up to 1000 year return period.

## 5.3 Detailed Pluvial Flood Risk Assessment & Surface Water Management

The proposed storm water management plan for the Kilmartin LAP lands including proposed SUDS, sub-catchments, surface water control, attenuation, storage and flood exceedence are presented in detail in the 'Kilmartin LAP 2012-2018 SUDS Strategy' report. Implementation of these proposals will address and mitigate residual risks relating to pluvial flood risk to the LAP lands.

## 5.4 Climate Change

The potential impact of climate change has been allowed for within the strategic flood risk assessment as follows;

- Pluvial flood risk - future drainage system and attenuation storage design to allow for a 10% increase in rainfall intensities, as recommended by the GDSDS.
- Fluvial Flood Risk – 20% increase in river flows has been applied to the hydraulic flood model and to the flood zone categories for the area as recommended by the GDSDS.

## 5.5 Sustainable Urban Structure

The development layout should consider ensure that there will be no ponding of surface water except in the attenuation zone or water compatible areas.

In addition the development layout should ensure that the LAP lands can be safely accessed and left during 1% AEP and 0.1% AEP flood events. The primary transport links to the LAP lands are the R121 and N2/N3 link road are through the middle and south west of the lands i.e. outside the fluvial flood zone categories A and B. These critical infrastructure links are therefore outside the fluvial flood risk areas but should be designed with drainage systems that consider pluvial flood risk. Secondary roads through the LAP lands should be located in flood zones B or C.

# **6.0** Conclusions

The Strategic Flood Risk Assessment for the Kilmartin LAP was undertaken in accordance with the requirements of the Planning System and Flood Risk Management Guidelines for Planning Authorities", November 2009.

Following the flood risk assessment stages of the Strategic Flood Risk Assessment, fluvial flood extents for the Kilmartin LAP lands were determined. These are presented in Appendix F.

It was concluded that the majority of the Kilmartin LAP lands are within Flood Zone C i.e. outside the 1000 year flood extents. However the existing drainage channels and watercourses serving the lands are important features for the conveyance and containment of run-off up to the 1000 year event.

It is recommended that the drainage channel/watercourses are retained and that riparian strips are provided to protect them and to ensure that they are maintained into the future. If development pressures require them to be relocated, then a detailed Site Specific Flood Risk Assessment should be provided highlighting compensation areas, equivalent conveyance etc.

Flood zones A and B will be reserved for water compatible development only

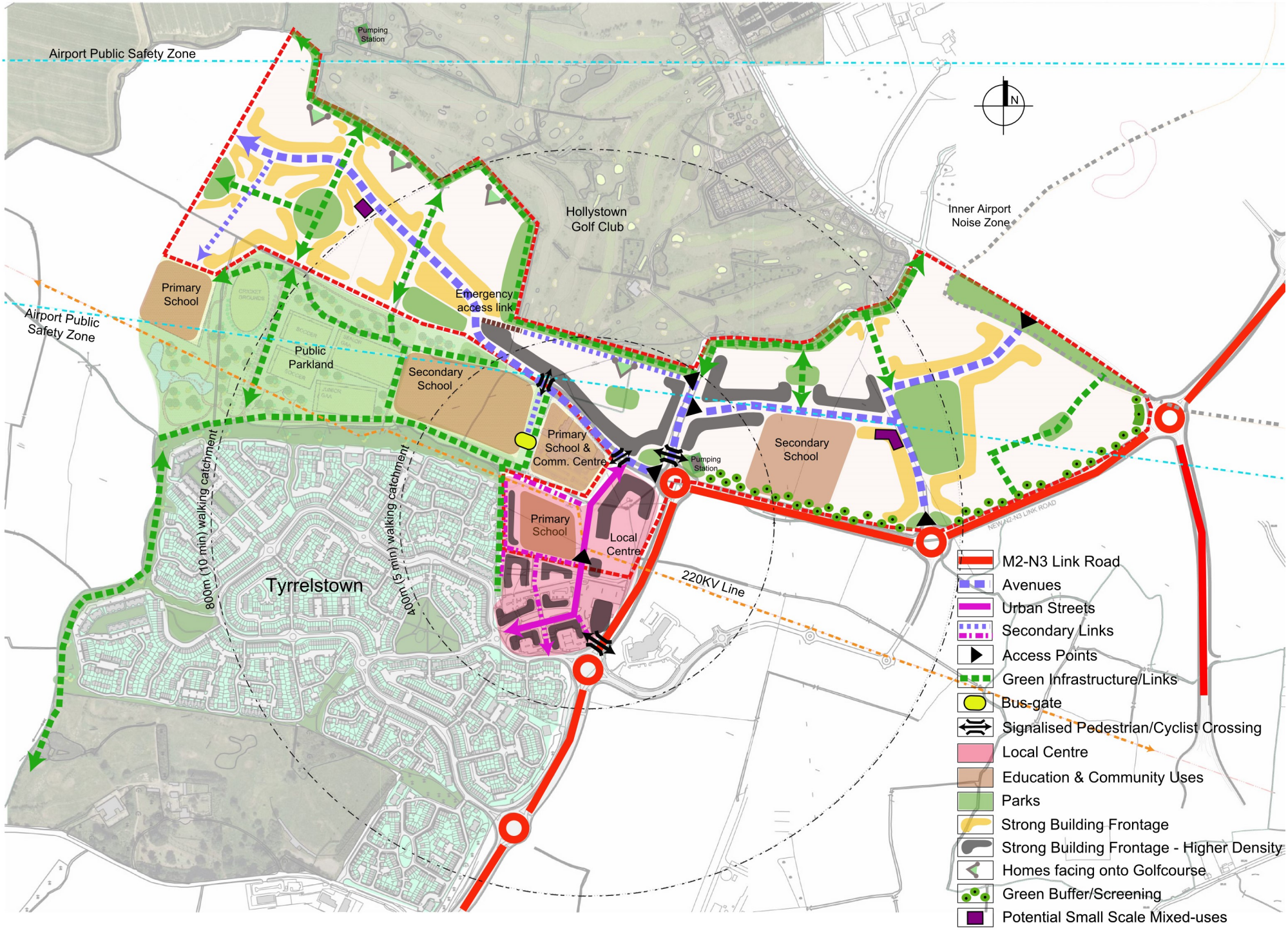
It is concluded that the sequential approach recommended by the Guidelines has been complied with for the majority of the Kilmartin LAP as most of the proposed development is within Flood Zone C. For those flood zones A and B, along the watercourses/ditches, it is recommended that any development that proposes to build within these applies the Justification Test at planning stage.

To address pluvial flood risk to the future development, it is recommended that the SUDS Strategy report be implemented. This will provide a common approach and strategy to manage surface water for the Kilmartin LAP lands such that pluvial flood risk is reduced and exceedence flooding occurs in designated areas. Implementing the surface water management recommendations and complying with the GDSDS will ensure that the LAP lands do not increase the risk of flooding to areas downstream.

It is recommended that Site Specific Flood Risk Assessments are undertaken by the future developments within the LAP lands to demonstrate that the principals and recommendations within the Guidelines and this SFRA are complied with. They should utilise more detailed topographic survey information and development proposals to identify exact extents of the flood Zones A and B while also detailing specific residual flood risk and mitigation measures e.g. freeboards to be implemented.

# Appendix A

# PROPOSED SCHEME LAYOUT


Airport Public Safety Zone
Pumping Station
Hollystown Golf Club
Inner Airport Noise Zone
N
Primary School
Emergency access link
Airport Public Safety Zone
Public Parkland
Secondary School
Primary School & Comm. Centre
Pumping Station
Secondary School
NEW M2-N3 LINK ROAD
800m (10 min) walking catchment
400m (5 min) walking catchment
Primary School
Local Centre
Tyrrelstown
220KV Line
M2-N3 Link Road
Avenues
Urban Streets
Secondary Links
Access Points
Green Infrastructure/Links
Bus-gate
Signalised Pedestrian/Cyclist Crossing
Local Centre
Education & Community Uses
Parks
Strong Building Frontage
Strong Building Frontage - Higher Density
Homes facing onto Golfcourse
Green Buffer/Screening
Potential Small Scale Mixed-uses

# Appendix B

# OPW FLOOD HAZARD WEBSITE REPORT

OPW National Flood Hazard Mapping

## Summary Local Area Report

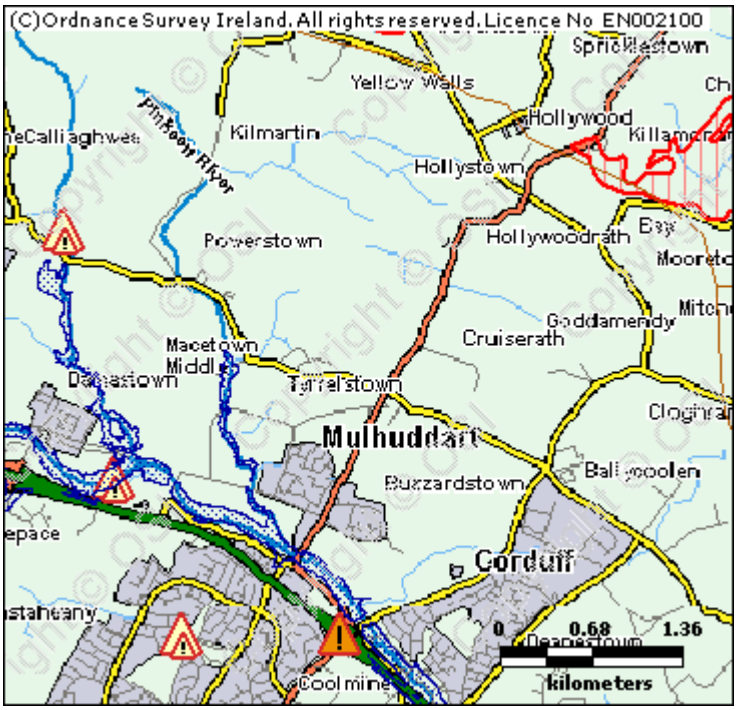
This Flood Report summarises all flood events within 2.5 kilometres of the map centre.

The map centre is in:

County: Dublin

NGR: O 072 418

This Flood Report has been downloaded from the Web site www.floodmaps.ie. The users should take account of the restrictions and limitations relating to the content and use of this Web site that are explained in the Disclaimer box when entering the site. It is a condition of use of the Web site that you accept the User Declaration and the Disclaimer.




Map Scale 1:56,228

| Map Legend | |
|---|---|
| | Flood Points |
| | Multiple / Recurring Flood Points |
| | Areas Flooded |
| | Hydrometric Stations |
| | Rivers |
| | Lakes |
| | River Catchment Areas |
| | Land Commission * |
| | Drainage Districts * |
| | Benefiting Lands * |

* Important: These maps do not indicate flood hazard or flood extent. Thier purpose and scope is explained in the Glossary.

## 6 Results

1. Tolka November 2002
Start Date: 13/Nov/2002
County: Meath, Dublin
Flood Quality Code:1
Additional Information: Photos (126) Reports (9) Videos (3) Press Archive (13) More Mapped Information

2. Tolka River Pinebrook Hartstown Nov 2002
Start Date: 13/Nov/2002
County: Dublin
Flood Quality Code:3
Additional Information: Reports (3) Videos (1) More Mapped Information

3. Tolka Navan Road Adj to Tolka Valley Park Nov 2002
Start Date: 13/Nov/2002
County: Dublin
Flood Quality Code:3
Additional Information: Photos (1) Reports (2) Videos (1) Press Archive (3) More Mapped Information

4. Pinebrook Hartstown Nov 2000
Start Date: 05/Nov/2000
County: Dublin
Flood Quality Code:3
Additional Information: Reports (1) Press Archive (2) More Mapped Information

5. Pinkeen Mayne/Clonee Recurring
Start Date:
County: Meath
Flood Quality Code:4

Additional Information: Reports (1) More Mapped Information

6. Tolka Navan Road, upstream of Mulhuddart Recurring

Start Date:

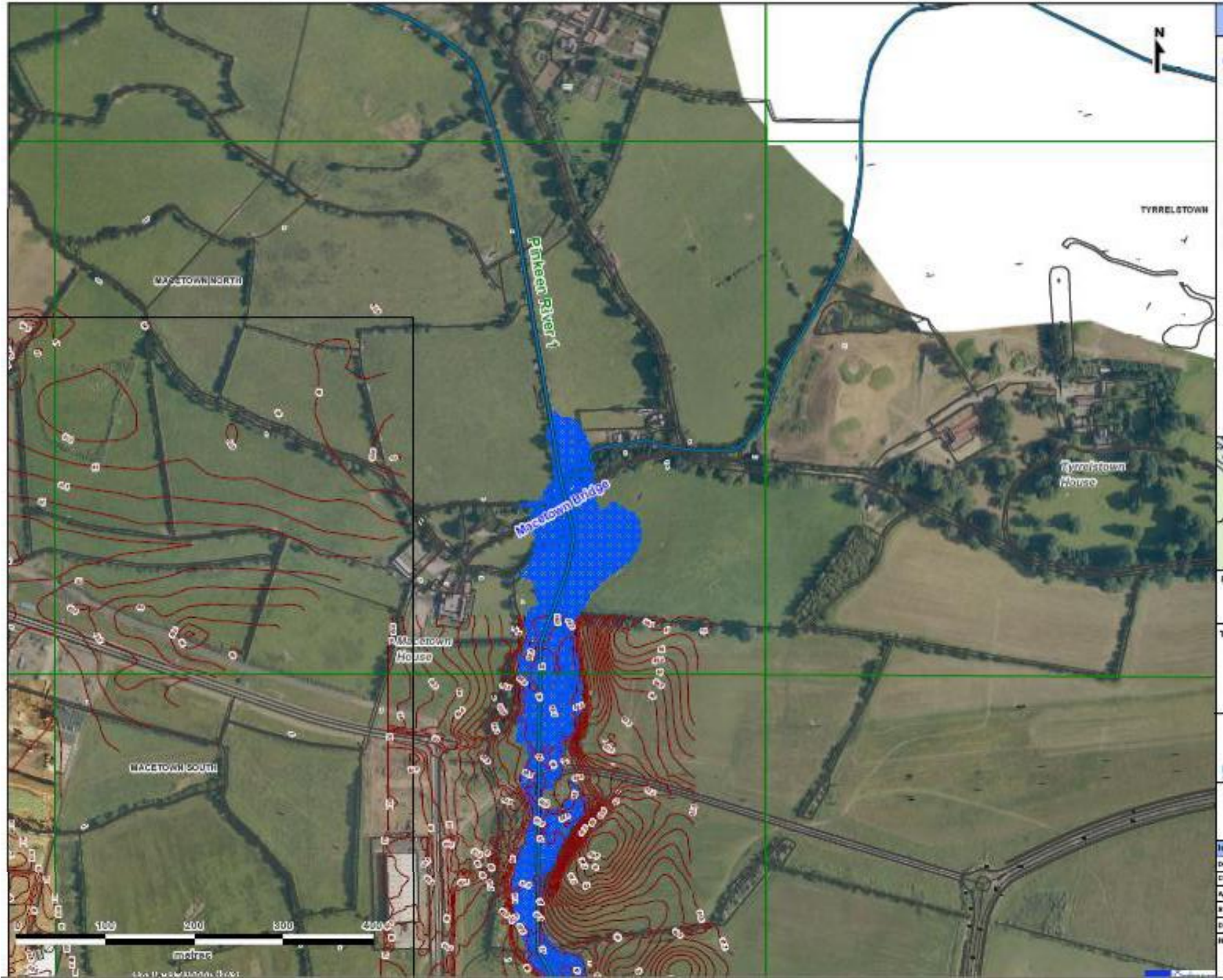
County: Dublin

Flood Quality Code: 4

Additional Information: Reports (2) More Mapped Information

# Appendix C

## RIVER TOLKA FLOODING STUDY, PINKEEN FLOOD EXTENTS MAPS




## Legend

- Tolka River & Tributaries
- Nov. 2002 Flood Extent
- Nov. 2002 Flow Direction
- Feb. 2002 Tidal Flood Extent
- Feb. 2002 Flow Direction
- 0.5 m Contours
- Weir

**Important Note and Disclaimer**

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Project

*River Tolka Flooding Study*

Title

# Historical Flooding (Frame 16)

*Greater Dublin Strategic Drainage Study*

Dublin Drainage

RPS moos

| Issue Details | | | |
|---|---|---|---|
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| Checked: A Chakravarti | | File Ref. | 074S15001MXF02F01 |
| Approved: G Gillespie | | | |
| Scale: 1 : 4,000 at A2 | | Drawing No. | Rev. |
| Date: 24.07.2008 | | 0162 | P01 |

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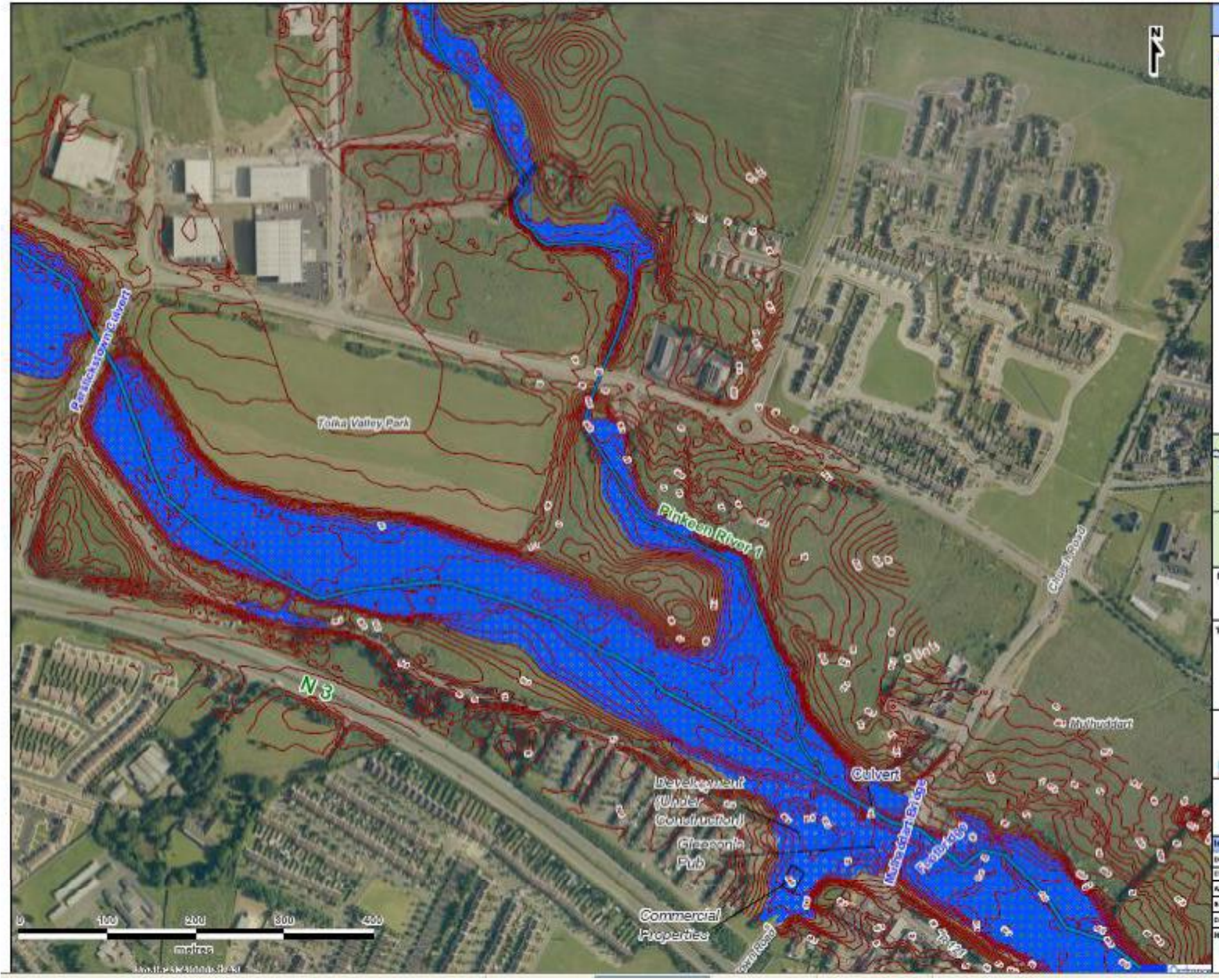
Legend
Tolka River & Tributaries
Nov. 2002 Flood Extent
Nov. 2002 Flow Direction
Feb. 2002 Tidal Flood Extent
Feb. 2002 Flow Direction
0.5 m Contours
Weir
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Project
River Tolka Flooding Study
Title
Historical Flooding (Frame 17)
Greater Dublin Strategic Drainage Study
Dublin Drainage
RPS moos
Issue Details
Drawn: H. Stenberg
Checked: A Charlesworth
Approved:
Scale: 1 : 4,000 at A3
Date: 28.07.2008
Project No.: 074 - 515 - 001
File Ref.: 074S1500MXX03F01
Drawing No.: 0003
Rev.: P01
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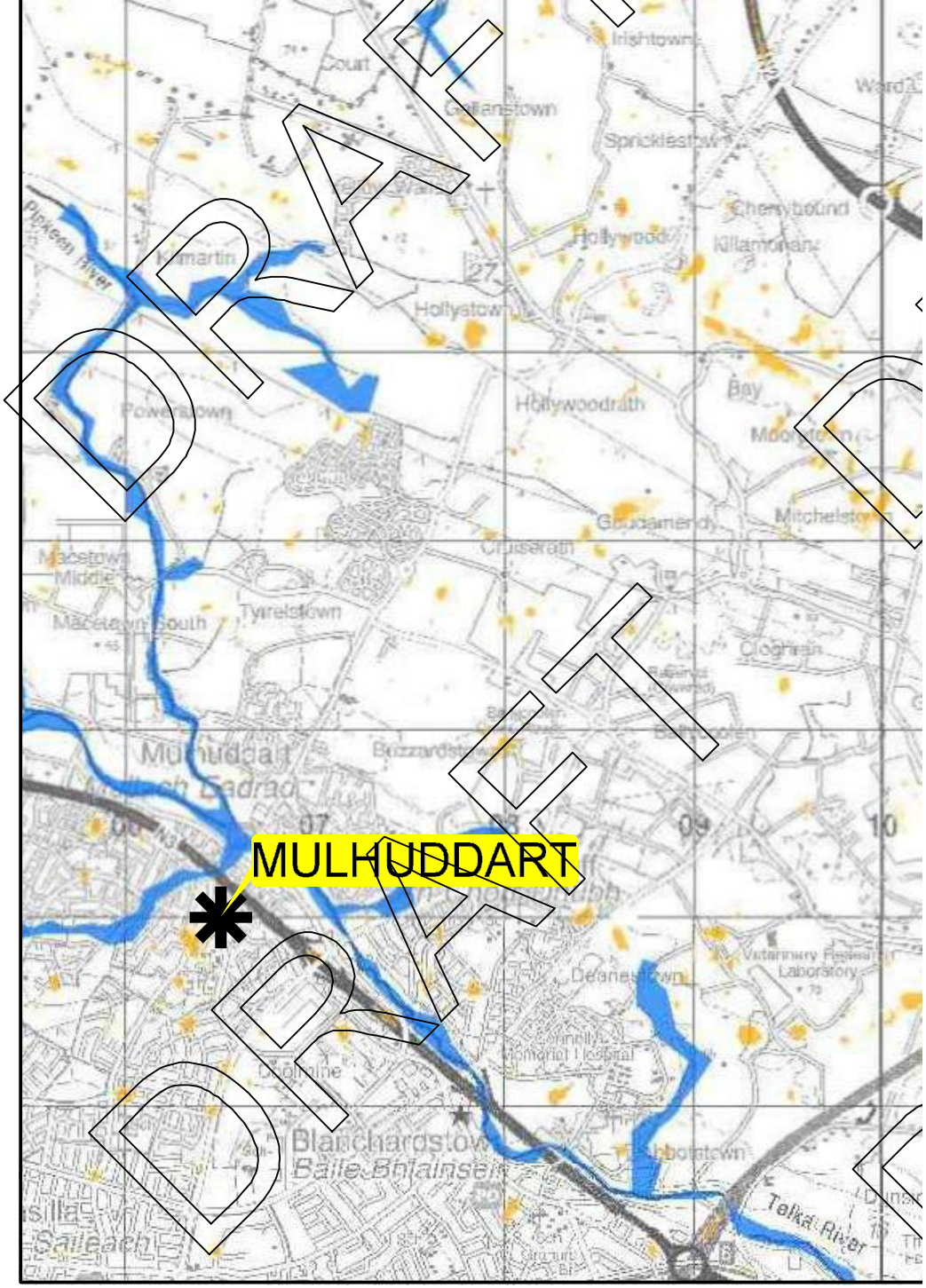
3. NOT TO SCALE: use figured dimensions only, if in doubt ask.
Tolka Valley Park
Pinkeen River 1
Clonshaugh Road
Culvert
Development (Under Construction)
Glasnevin Pub
Commercial Properties
Ratoath Road
N3
0
100
200
300
400
metres

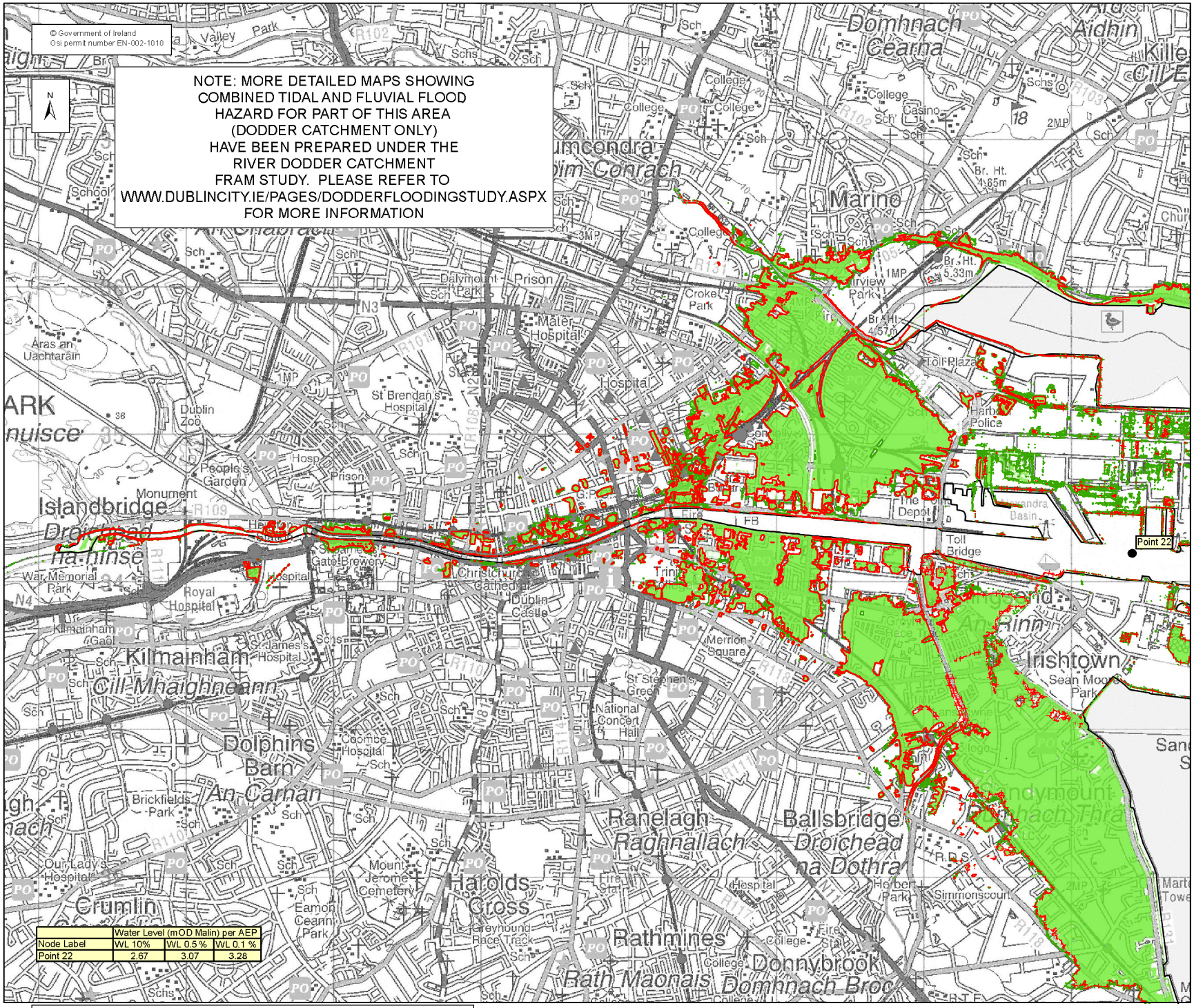
# Appendix D

## PRELIMINARY FLOOD RISK ASSESSMENT (PFRA) MAP EXTRACT

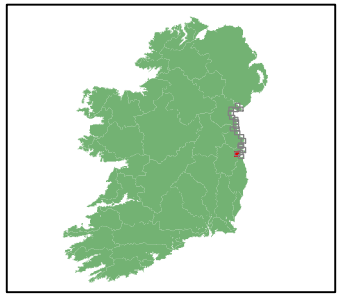

MULHUDDART
DRAFT
DRAFT
Irishtown
Spricklestown
Hollystown
Hollywoodrath
Tyrrelstown
Cloghran
Blanchardstown
Baile Bhlainséir
Telka River
0.5 0.25 0 0.5 1 1.5 2 2.5 3 3.5

# Appendix E

## ICPSS COASTAL FLOOD EXTENTS MAPS FOR DUBLIN




Location Plan :



**EXTENT MAP**

Legend:

- 0.5% AEP FLOOD EXTENT (1 in 200 chance in any given year)
- 0.1% AEP FLOOD EXTENT (1 in 1000 chance in any given year)
- Very High Confidence (0.1% AEP)
- High Confidence (0.1% AEP)
- Medium Confidence (0.1% AEP)
- Low Confidence (0.1% AEP)
- Very Low Confidence (0.1% AEP)
- Very High Confidence (0.5% AEP)
- High Confidence (0.5% AEP)
- Medium Confidence (0.5% AEP)
- Low Confidence (0.5% AEP)
- Very Low Confidence (0.5% AEP)
- High Water Mark (HWM)
- Node Point
- Point 34 Node Label (refer to table)

USER NOTE :

USERS OF THESE MAPS SHOULD REFER TO THE DETAILED DESCRIPTION OF THEIR DERIVATION, LIMITATIONS IN ACCURACY AND GUIDANCE AND CONDITIONS OF USE PROVIDED AT THE FRONT OF THIS BOUND VOLUME. IF THIS MAP DOES NOT FORM PART OF A BOUND VOLUME, IT SHOULD NOT BE USED FOR ANY PURPOSE.

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Project :
IRISH COASTAL PROTECTION STRATEGY STUDY - PHASE III

Map :
NORTH EAST COAST FLOOD EXTENT MAP

| | | | |
|---|---|---|---|
| Map Type : | FLOOD EXTENT | | |
| Source : | TIDAL FLOODING | | |
| Map area : | RURAL AREA | | |
| Scenario : | CURRENT | | |
| Figure By : | P.W | Date : | Jan 2010 |
| Checked By : | JMC | Date : | Jan 2010 |

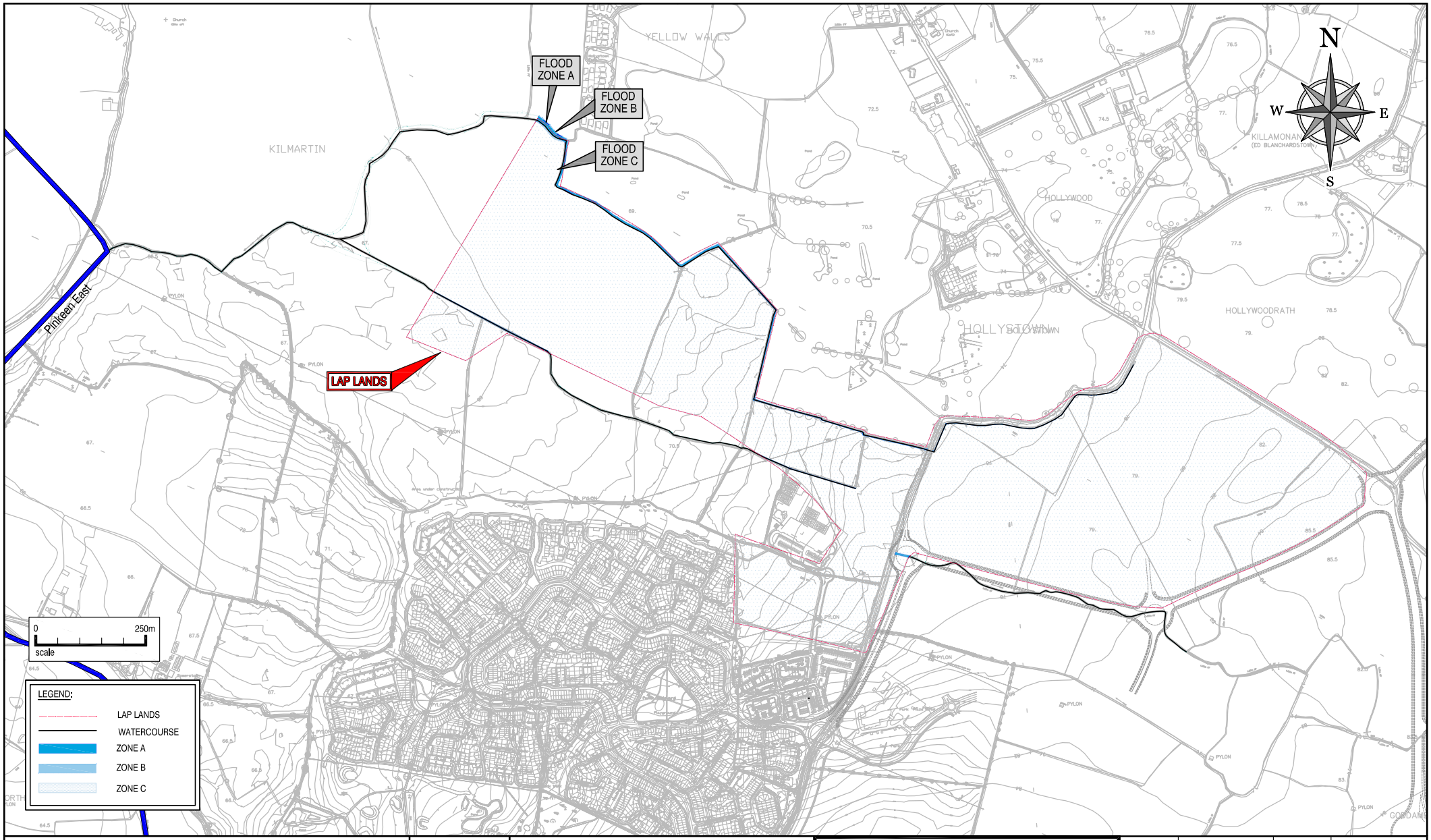
Figure No. : NE / RA / EXT / 19

Revision 1

Drawing Scale : 1:25,000 Plot Scale : 1:1 @ A3

# Appendix F

# FLOOD ZONE CATEGORY MAPS




PROJECT

KILMARTIN LAP

DRG. TITLE

KILMARTIN LAP FLOOD ZONES
- TOPOGRAPHICAL -

NOTES

1. DO NOT SCALE FROM THIS DRAWING.
2. SURVEY TO ING CO-ORDINATE SYSTEM.
3. SURVEY TO MALIN HEAD DATUM.

ORDNANCE SURVEY IRELAND LICENCE No EN 0017912
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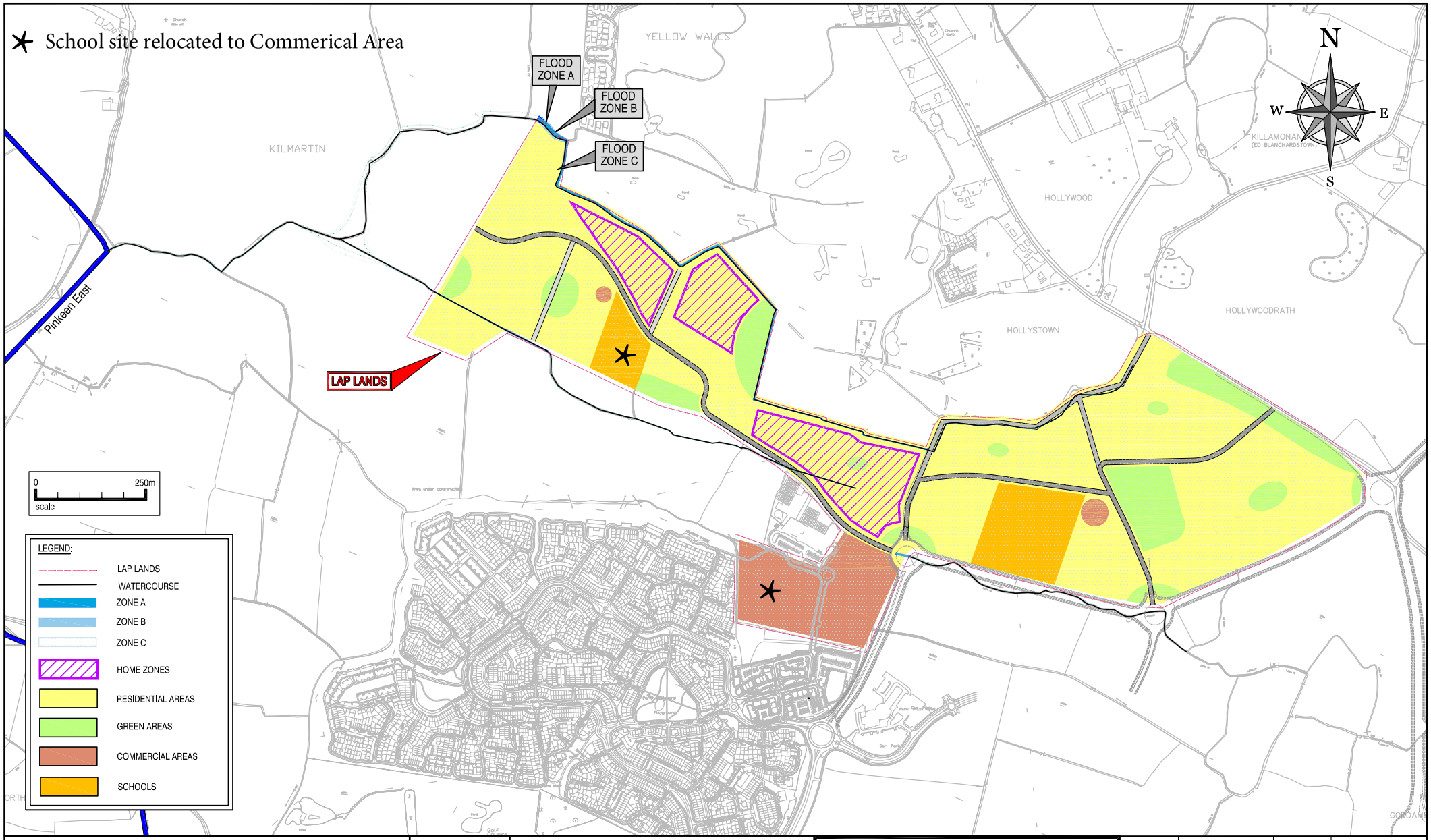
| | | | |
|---|---|---|---|
| DESIGNED | JBK | PREPARED | KJL'E |
| DATE | OCT 2012 | CHECKED | JBK |

CLIENT

Fingal County Council
Comhairle Contae Fhine Gall

| | | | |
|---|---|---|---|
| SCALE | NTS [A3] | DRG. NO. | 123050-9040 |
| FILE REF. | 123050-9040 | | |




PROJECT

KILMARTIN LAP

DRG. TITLE

KILMARTIN LAP FLOOD ZONES
- ARCHITECTURAL -

NOTES

1. DO NOT SCALE FROM THIS DRAWING.
2. SURVEY TO ING CO-ORDINATE SYSTEM.
3. SURVEY TO MALIN HEAD DATUM.

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| SCALE NTS [A3] | DRG. NO. 123050-9041 |
| FILE REF. 123050-9041 | |

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