MALONE O'REGAN
CONSULTING ENGINEERS

PROPOSED PART 8 RESIDENTIAL DEVELOPMENT

KISHOGE, LUCAN, CO. DUBLIN

DESKTOP FLOOD RISK ASSESSMENT

SOUTH DUBLIN COUNTY COUNCIL

May 2024

Job: 23006

Contents Amendment Record

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Title: **NDFA – Social Housing Bundles**
Kishoge Desktop Flood Risk Assessment

Job Number: **23006**

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Checked By: **Douglas Weir** **Signed:**

Approved By: **Douglas Weir** **Signed:**

Revision Record

Issue No.	Date	Description	Remark	Prepared	Checked	Approved
0	14.07.23	Initial Issue	N/A	AB	PB	PB
1	20/10/2023	Information	N/A	KA	PB	PB
2	27/05/2024	Pre-Planning	P1	KA	DW	DW

CONTENTS

1 INTRODUCTION

Malone O'Regan was commissioned by the National Development Finance Agency (NDFA), to undertake a Desktop Flood Risk Assessment (DFRA) in support of a Part 8 Planning Application for a proposed development site at Kishoge, Lucan, Co. South Dublin.

The purpose of this DFRA is to assess the potential flood risk to the proposed development site and to assess the impact that the development as proposed may or may not have on the hydrological regime of the area.

Quoted ground levels or estimated floor levels relate to Ordnance Datum (Malin) unless stated otherwise.

The flood risk assessment has been carried out in accordance with the Government's 2009 Planning System and Flood Risk Management Guidelines (hereafter referred to as the 2009 Planning Guidelines). These guidelines adopt a staged approach to the assessment of flood risk.

This report describes a Stage 2 Initial Flood Risk Assessment which is defined within the 2009 Planning Guidelines as follows:

"A qualitative or semi-quantitative study to confirm sources of flooding that may affect a plan area or proposed development site, to appraise the adequacy of existing information, to provide a qualitative appraisal of the risk of flooding to development, including the scope of possible mitigation measures, and the potential impact of development on flooding elsewhere, and to determine the need for further detailed assessment."

The study was principally focused on examining flooding risks to the proposed site from the River Griffeen.

2 PROPOSED SITE DESCRIPTION

2.1 Site Description

The proposed site is currently and used lot near R136 and Thomas Omer Way. The site is situated next to residential developments at Lynch's Park and two community colleges.

The total area of the proposed development site is approximately 2.4 hectares.

The location of the proposed site is illustrated on Figure 1 below.

Figure 1 – Site Location showing the indicative Site Boundary and Adjacent Developments

2.2 Surrounding Watercourse

There are no hydrological features within the near vicinity of the site. The River Griffeen flows north, 1.3km west of the site. The River Griffeen generally flow north until it outlets into the River Liffey 3km north west of the site.

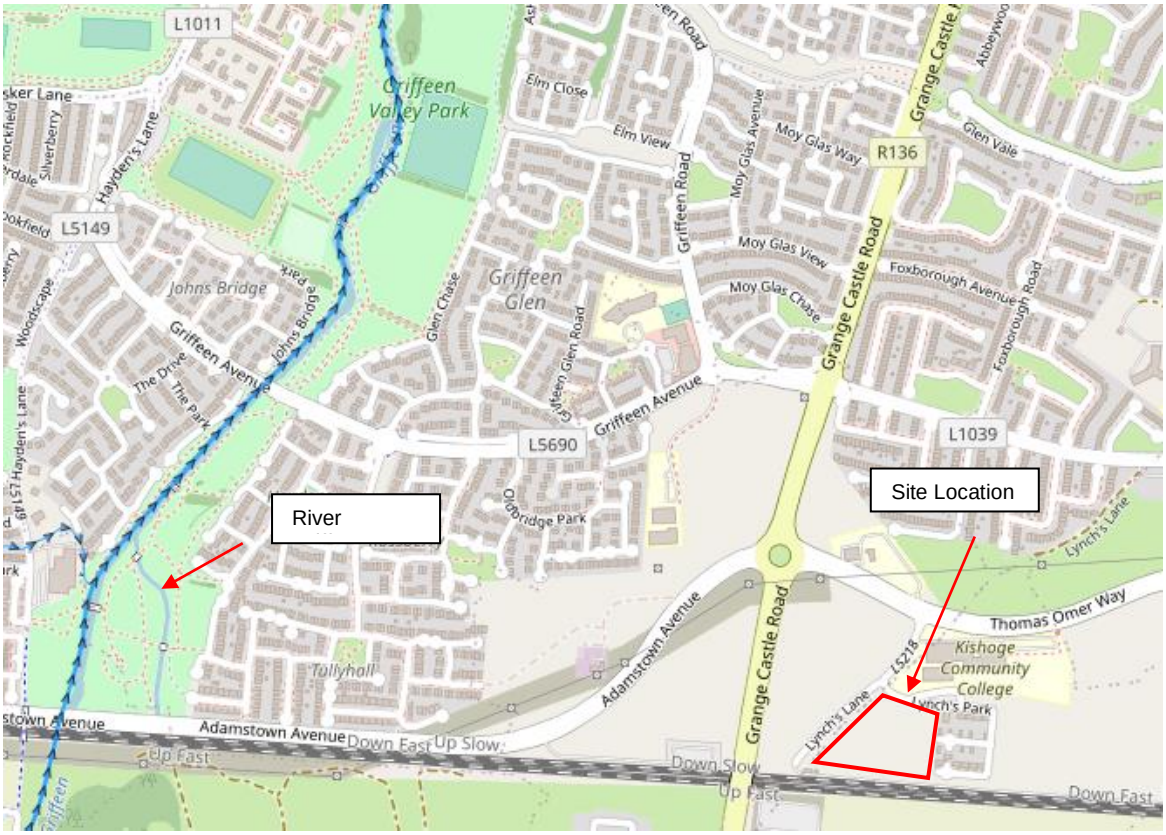


Figure 2 – Surrounding Watercourse
(Extract from the EPA Maps)

2.3 Project Description

The proposed development includes:

i. 118 no. residential units in a mix of two storey houses, 3 storey duplex units and apartment blocks of 4 – 6 storeys comprising 26 no. 1 bed apartments; 42 no. 2 bed apartments; 21 no. 3 bed apartments; 23 no. 3 bed houses; and 6 no. 4 bed houses, with renewable energy design measures (which may be provided externally) for each housing unit;

ii. Landscaping works including provision of (a) communal open space areas (b) outdoor sports and play areas; (c) new pedestrian and cycle connections; and (d) civic plaza;

iii. Associated site and infrastructural works including provision for (a) ESB substations and switchrooms; (b) energy centre to the rear of 6 storey block; (c) photovoltaic panels; (e) car and bicycle parking; (f) public lighting; (g) bin storage; (h) temporary construction signage; (i) estate signage; and (j) varied site boundary treatment comprising walls and fencing; and

iv. all associated site development works.

2.4 Land Use Zone

Land use zoning map is used in order to assess which types of developments, based on vulnerability to flood risk, are appropriate for each Flood Zones.

Where developments/land uses are proposed that are considered inappropriate to the Flood Zone that may be identified in the future at project level following adoption of the Plan, then a Development Management Justification Test and site-specific Flood Risk Assessment will be required in accordance with The Planning System and Flood Risk Management Guidelines 2009 (and as updated).

Vulnerability Class	Land Use and Types of Development which include
Highly vulnerable development (including essential infrastructure)	Garda, ambulance and fire stations and command centres required to be operational during flooding; Hospitals; Emergency access and egress points; Schools; Dwelling houses, student halls of residence and hostels; Residential institutions such as residential care homes, children's homes and social services homes; Caravans and mobile home parks; Dwelling houses designed, constructed or adapted for the elderly or other people with impaired mobility; and Essential infrastructure, such as primary transport and utilities distribution, including electricity generating power stations and sub-stations, water and sewage treatment, and potential significant sources of pollution (SEVESO sites, IPPC sites, etc.) in the event of flooding.
Less vulnerable Development	Buildings used for: retail, leisure, warehousing, commercial, industrial and non-residential institutions; Land and buildings used for holiday or short-let caravans and camping, subject to specific warning and evacuation plans; Land and buildings used for agriculture and forestry; Waste treatment (except landfill and hazardous waste); Mineral working and processing; and Local transport infrastructure
Water compatible development	Flood control infrastructure; Docks, marinas and wharves; Navigation facilities; Ship building, repairing and dismantling, dockside fish processing and refrigeration and compatible activities requiring a waterside location; Water-based recreation and tourism (excluding sleeping accommodation); Lifeguard and coastguard stations;

Vulnerability Class	Land Use and Types of Development which include
Water compatible development Contd.	Amenity open space, outdoor sports and recreation and essential facilities such as changing rooms; and Essential ancillary sleeping or residential accommodation for staff required by uses in this category (subject to a specific warning and evacuation plan).

Table 1 - Matrix of Vulnerability vs. Flood Zone
(Extract from the Strategic Flood Risk Assessment of the Clonburris Strategic Development Zone (SDZ) Planning Scheme 2019)

Refer to Flood Risk Management Guidelines 2009 and 'Strategic Flood Risk Assessment for the Clonburris SDZ Planning Scheme 2019' for additional detail:

- Highly vulnerable developments include houses, schools, hospitals, residential institutions, emergency services, essential infrastructure, etc.
- Less vulnerable developments include economic uses (retail, leisure, warehousing, commercial, industrial, non-residential institutions, etc.), land and buildings used for agriculture or forestry, local transport infrastructure, etc.

Land use zone map is provided in the SFRA of the Clonburris SDZ Planning Scheme 2019'. The different land zone is illustrated in Figure 3 below and the full map is provided in Appendix A.

The proposed development is located within land zoned as *"Mixed Use Residential"*.

The immediate surrounding area is zoned as *"Mixed Use Residential."* Beyond that there is a mix of *"Primarily Residential"* and *"Open Area."*

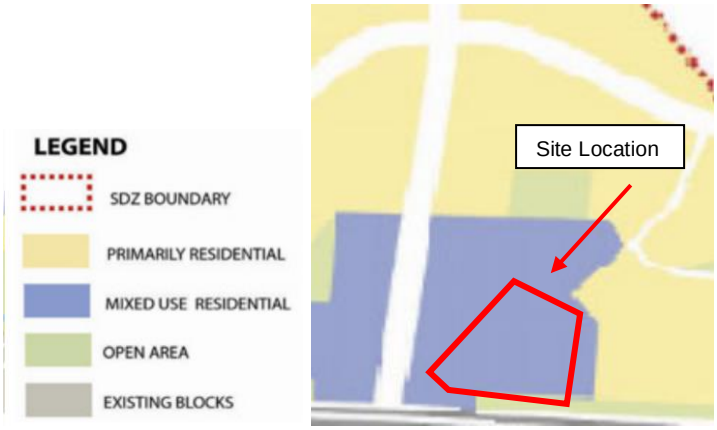


Figure 3 – Land Use Zoning Map (Extract from SFRA of the Clonburris SDZ Planning Scheme 2019)

2.5 Existing Topography Levels at Site

The site is relatively flat with the level of +60.44m in the southwestern corner of the site and +60.20m in the southeastern corner of the site. The level of +59.05m in the northwestern corner of the site and +60.00m in the northeastern corner of the site. The central area of the site varies from +59.55m on the west side to +60.10m on the east side. There are some mounds on the site with top of bank level +62.22m to the base of the bank +60.14m in the northeast area of the site.

3 FLUVIAL FLOOD RISK ASSESSMENT

The following sources of information were reviewed in order to identify any flood risk to the proposed development site as a result of fluvial flooding:

- The National Preliminary Flood Risk Assessment (PFRA) – Overview Report & Indicative Flood Maps
- Climate Change
- OPW Flood Records from www.floodmaps.ie
- Ordnance Survey Historic Mapping
- Strategic Flood Risk Assessment, Clonburris SDZ Planning Scheme 2019

3.1 The National Preliminary Flood Risk Assessment

The National Preliminary Flood Risk Assessment (PFRA), which was carried out by the OPW in March 2012, identified Areas of Further Assessment (AFA) where further, more detailed assessment was required to determine the degree of flood risk. Flood Risk Assessment Maps were prepared by the Catchment Flood Risk Assessment and Management (CFRAM) Study which indicate the extent of flooding caused by fluvial flood events with an annual exceedance probability (AEP) of 10% (10yr event), 1% (100yr event) and 0.1% (1000yr event) in these areas. The final versions of the maps were published in May 2017.

The CFRAM maps indicating the extent of flooding caused by a fluvial flood event with an annual exceedance probability (AEP) of 10% (10yr event), 1% (100yr event) and 0.1% (1000yr event) are included in Appendix B.

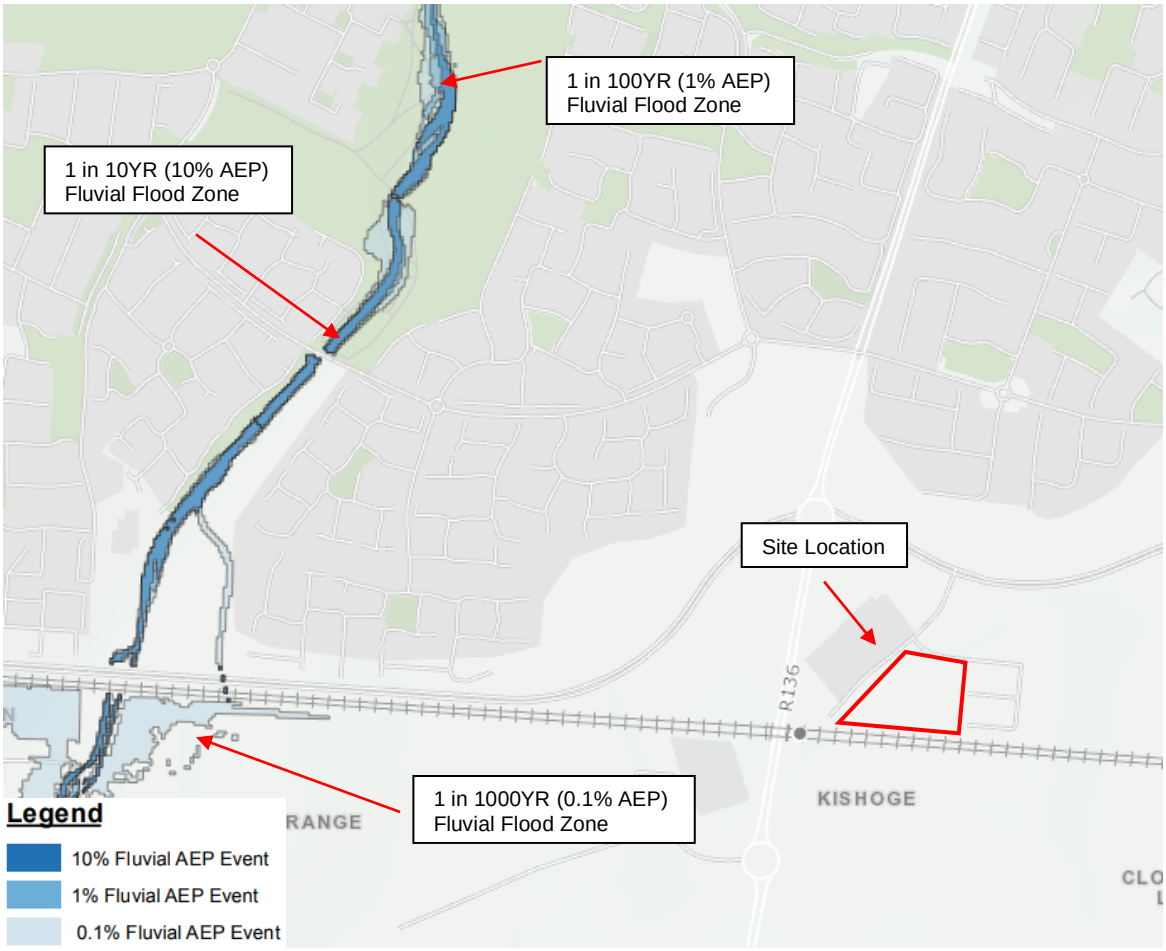


Figure 4 – CFRAM Fluvial Flood Extent Map (Extract from OPW)

The PFRA flood mapping indicates that the proposed development site does not fall within any current fluvial flood zones. The site is far enough away from the River Griffeen to not fall within a flood zone for it.

The CFRAMS flood map also provides information on predicted water levels for the 10% AEP (1 in 10 year), 1% AEP (1 in 100 year) and 0.1% AEP (1 in 1000 year) fluvial flood events at various node points along the River Griffeen. The node points are listed in Table 2 below. The location of the node points is indicated in Figure 5 and on the drawings in Appendix B. Predictive extreme flood levels at the node point closest to the site are applicable to utilise in the assessment of potential fluvial flood risk to the proposed development site.

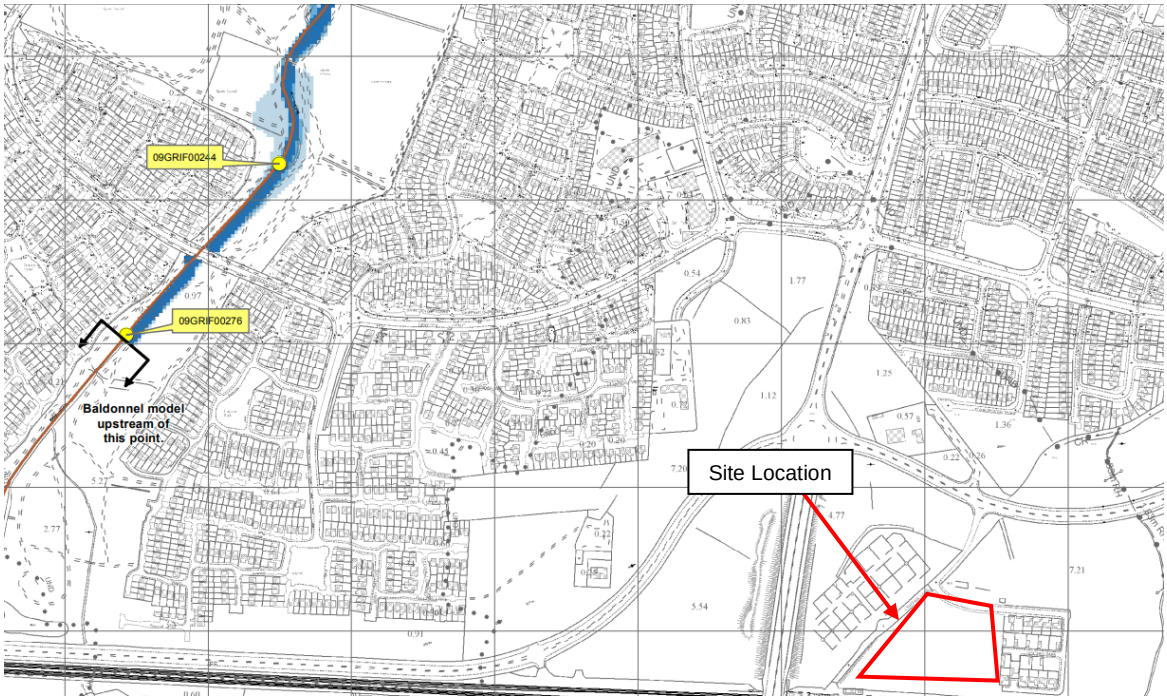


Figure 5 – Extract from PFRA Maps (Extract from OPW)

Node Label	Water Level 10% AEP	Water Level 1% AEP	Water Level 0.1% AEP
09GRIF00276	**51.33**	**51.63**	**51.99**
09GRIF00244	49.61	50.11	50.66

Table 2 – CFRAMS Predicted Water Levels

According to the SFRA of the Clonburris SDZ Planning Scheme 2019 the recommended minimum finished floor level is to be:

Scenario	Finished floor level to be based on
Fluvial, undefended	1% AEP flood + climate change (20% allowance for highly vulnerable development) + 300mm freeboard

Table 3 – Recommended Minimum Finished Floor Levels
(Extract from the Strategic Flood Risk Assessment of the Clonburris Strategic Development Zone Planning Scheme 2019)

When reviewing these levels, consideration needs to be given to the potential impact of climate change, resulting in increased quantities of rainfall. The Planning System and Flood Risk Management Guidelines for Planning Authorities DOEHLG 2009 Technical Appendix A, Section 1.6 recommends that, 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. Therefore, the predicted 0.1% AEP flood level listed in above (51.99m OD) is considered

to be representative of the 1% AEP (1 in 100 year) mid-range future climate change scenario.

Using the information obtained from the predicted flood level, in order to permit a sustainable development of this site and to mitigate against potential residual flood risk to the development it is recommended that the finished floor level for all units should be above a minimum level of 51.99+500mm freeboard = 52.49m OD. The minimum proposed finished floor level is 59.35m OD which is significantly higher than the required minimum finished floor level.

3.2 OPW Flood Records

The OPW Flood Maps Website (www.floodinfo.ie) was consulted in relation to available historical or anecdotal information on any flooding incidences or occurrences in the vicinity of the proposed development site. These records, which are summarised in Appendix C of this report, indicate 7 recorded flood events within a 2.5km radius of the proposed site.

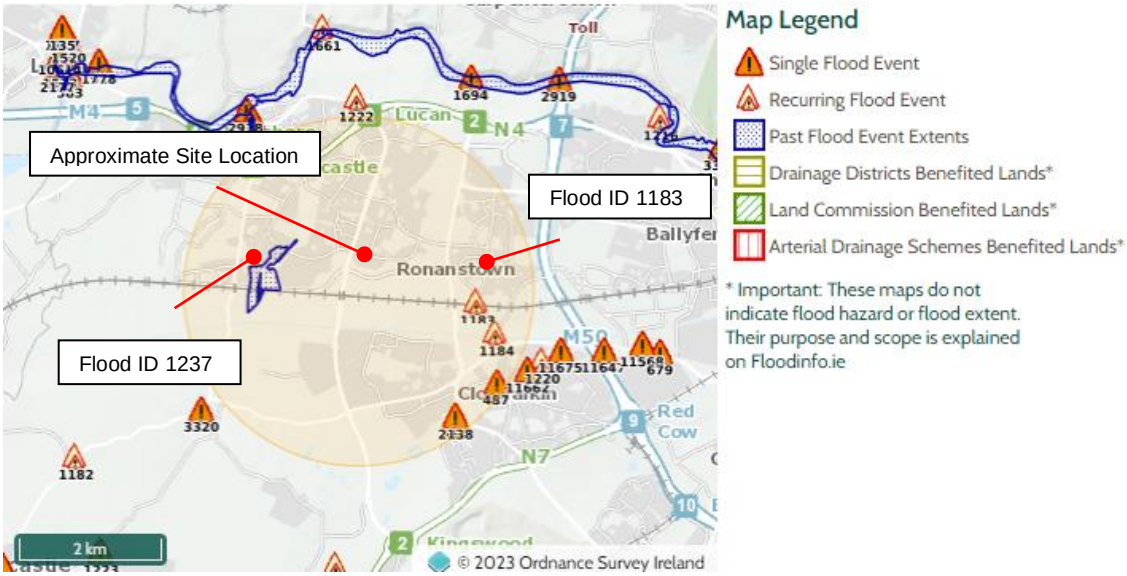


Figure 6 – OPW Flood Event Summary

Figure 6 indicates various historical flooding events within Lucan Area, however there are no recorded recurring instances of flood events mapped within the immediate vicinity of the site. There are two recurring flood instances within the radius of the site. Flood ID 1237 is an area that flooded in 2000 due to poor channel maintenance. Given that another flood has not occurred since this likely does not pose a threat in the present. The other flood, ID 1183, hasn't occurred since 2005 and only affected the immediate surrounding area.

Based on available and recorded information as outlined above, the development site is considered not to have been subject to flooding in recent history.

3.3 Ordnance Survey Historic Mapping

Historic Groundwater Flood Maps were produced by Geological Survey Ireland. The historic groundwater flood map is a national-scale flood map presenting the maximum historic observed extent of karst groundwater flooding. The map is primarily based on the winter 2015/2016 flood event, which in most areas represented the largest groundwater flood event on record. The map was produced based on the SAR imagery of the 2015/2016 event as well as any available supplementary evidence. The floods were classified by flood type differentiating between floods dominated by groundwater (GW) and floods with significant contribution of groundwater and surface water (GWSW).

The map that was viewed was the historical 6-inch map (pre-1900). Figure 7 below illustrate the historic mapping for the area of the proposed development site.

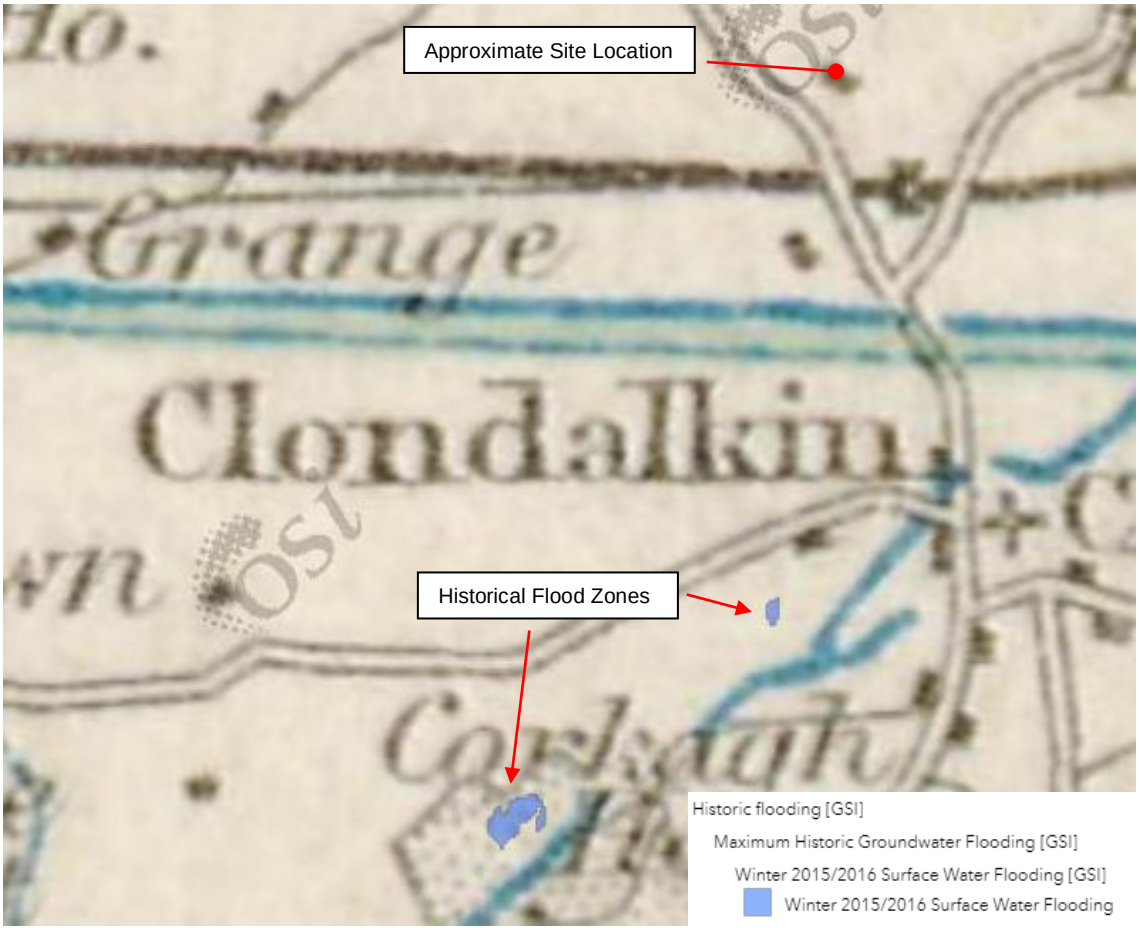


Figure 7 – Historic 6 Inch Mapping

Figure 7 illustrates that the historic 6-inch mapping does not indicate any historical or anecdotal instances of flooding within or adjacent to the boundary of the proposed development site. The nearest historical flood zone is 2.2km away and should have no impact on the site. The flooding occurred within the near vicinity of the river.

3.4 Strategic Flood Risk Assessment, Clonburris SDZ Planning Scheme 2019

A Strategic Flood Risk Assessment (SFRA), as required by 'The Planning System and Flood Risk Management Guidelines for Planning Authorities' (DEHLG and OPW, 2009), has been undertaken as part of the preparation of the Clonburris SDZ Planning Scheme 2019.

3.4.1 Composite Flood Zone Map

The SFRA contains a Composite Flood Zone Map, the map is included in Appendix D and an extract is shown in Figure 8.

Figure 9 indicates that the proposed development falls within a predictive Flood Zone C. There is no Zone A nor Zone B within the vicinity of the site.

Figure 8 – Composite Flood Map – Zoomed In

Figure 9 – Composite Flood Map
(Extract from the SFRA of the Clonburris SDZ Planning Scheme 2019)

4 OTHER FLOOD SOURCES

4.1 Tidal Flooding

The proposed development site is located approximately 7.5km south-east of the nearest potential source of tidal flooding in the River Liffey Estuary. A review of the OPW Tidal Flood Extents Mapping was carried out and indicates that the proposed development site does not fall within a the predicted extreme 0.1% (1 in 1000-year current scenario) tidal flood event.

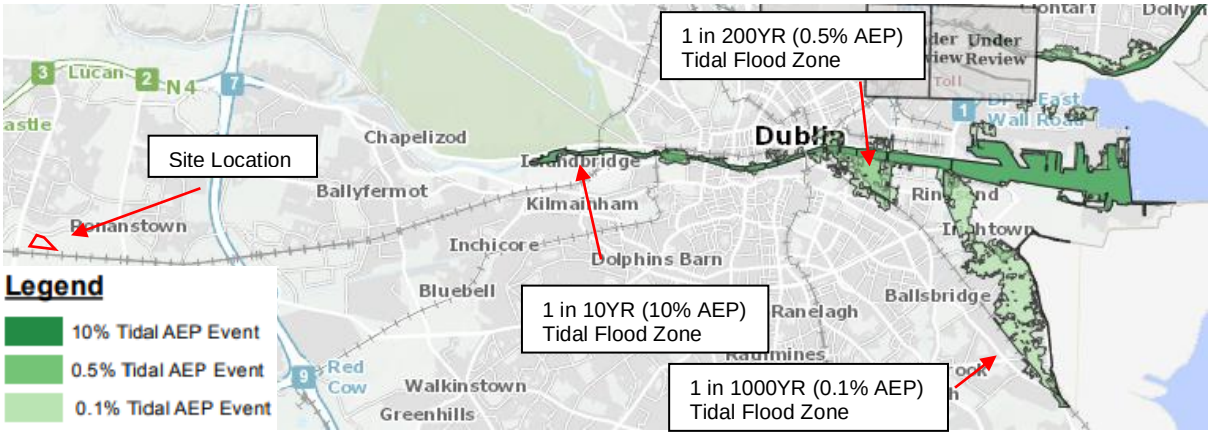


Figure 10 – CFRAM Tidal Flood Extent Map
(Extract from OPW)

4.2 Pluvial Flooding

Pluvial flooding occurs when the amount of rainfall exceeds the capacity of urban surface water drainage systems or the ground to absorb it. A review of the available literature including the OPW PFRA study was carried out and indicates some pluvial flooding surrounding the site. Note, these maps are 'predictive' flood maps showing areas predicted to be inundated during a theoretical or 'design' flood event with an estimated probability of occurrence, rather than information for actual floods that have occurred in the past, which is presented on 'historical' flood maps.

The flood mapping indicates no pluvial flooding occurs within the boundary of the site. The surrounding area also does not experience a high concentration of pluvial flooding.

Figure 11 – Pluvial Flood Extent Map
(Extract from OPW)

5 SEQUENTIAL APPROACH TO PLANNING

The document "Planning Systems and Flood Risk Management: Guidelines for Planning Authorities November 2009" requires the adoption of a sequential approach to flood risk management when assessing the location for new developments. This approach is a risk-based method to guide development away from areas that have been identified through flood risk assessment as being at risk from flooding. The philosophy used in this approach is outlined in Figure 12 below.

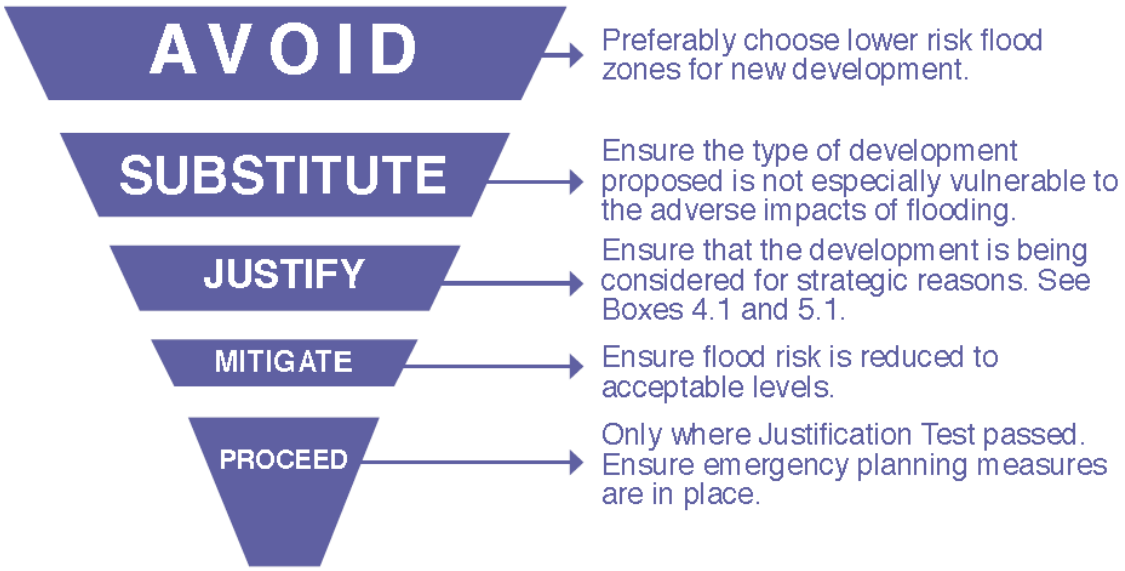


Figure 12 Source: The Planning Systems and Flood Risk Management: Guidelines for Planning Authorities November 2009

The sequential approach uses mapped flood zones alongside considerations of the vulnerability of different types of development to give priority to development in zones of low flood probability.

5.1 Flood Zones

The flood zones are defined on the basis of flooding from rivers and the sea. The different flood zones recommended in the 2009 Planning Guidelines are:

Flood Zone A – Highest risk area where there is a 1% chance of flooding in any one year from rivers and a 0.5% chance of coastal flooding.

Flood Zone B – Moderate risk area where the chance of flooding in any one year is 0.1-1% for rivers and 0.1-0.5% for coastal flooding.

Flood Zone C – Low risk area with less than 0.1% chance of flooding from rivers or the sea in any given year.

As described in Section 3 and Section 4, the proposed development is outside of the area predicted to flood during a 0.1% AEP (1 in 1000year) fluvial flood event. The development is therefore located within Flood Zone C in accordance with the 2009 Planning Guidelines.

5.2 Vulnerability Class of Proposed Development

The vulnerability class of the development is dependent on the land use and type of development proposed. See Table 3 for the vulnerability classes.

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

Table 4 - Classification of Vulnerability to Flooding for Various Development Types (Source – Table 3.1 Planning System and Flood Risk Management – Guidelines for Planning Authorities DEHLG, OPW, November 2009)

The 2009 Planning Guidelines presents a matrix of vulnerability versus flood zone to illustrate appropriate development and the requirement of justification tests. That matrix can be seen in Table 5. Based on the land uses listed in Table 3, the proposed residential development is classified as a highly vulnerable development. However, the development will be located in Flood Zone C and is therefore considered to be appropriate and a Justification Test is not therefore required.

	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 5 - Matrix of Vulnerability vs. Flood Zone
(Source – Table 3.1 Planning System and Flood Risk Management – Guidelines for Planning Authorities DEHLG, OPW, November 2009)

6 SUMMARY AND CONCLUSIONS

The analysis and flood zone delineation undertaken as part of this DFRA indicates that the proposed site is not expected to be impacted during the occurrence of a 0.1% AEP (1 in 1000 year) fluvial flood event.

The PFRA flood mapping indicates that the proposed development site does not fall within the predicted extreme 0.1% (1 in 1000 year) current scenario fluvial flood zone. The site is not located near any major open watercourse.

The node point closest to the northern boundary of the site is referenced as node point *09GRIF00276*. The 1% AEP (1 in 100 year) and 0.1% AEP (1 in 1000 year) flood levels at this point are predicted as 51.63m and 51.99m respectively.

According to the SFRA of the Clonburris SDZ Planning Scheme 2019, it is recommended that for a scenario of fluvial event-undefended, the minimum finished floor level is to be based on 1% AEP flood + climate change (20% allowance for highly vulnerable development) + 300mm freeboard.

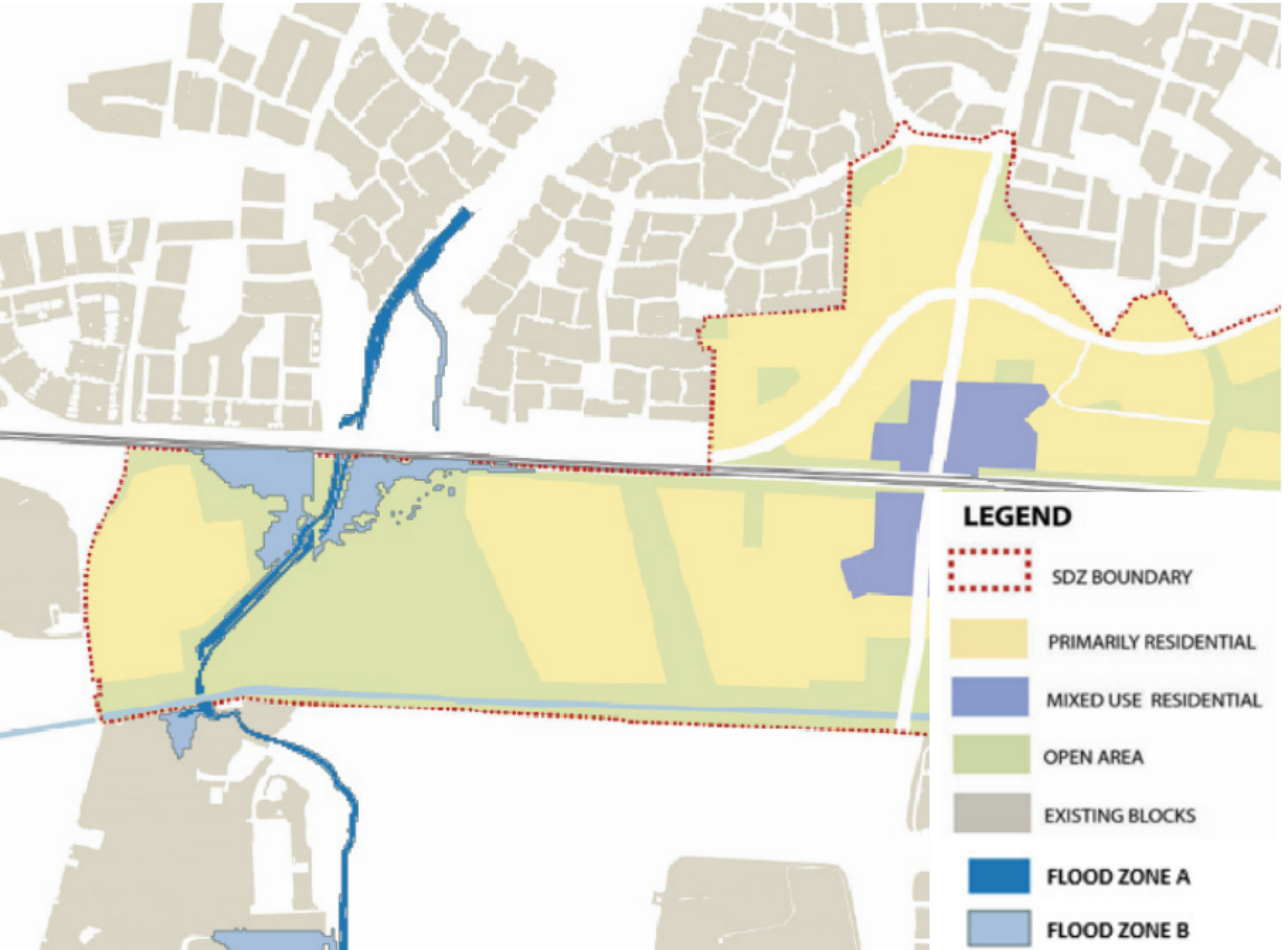
The Planning System and Flood Risk Management Guidelines for Planning Authorities DOEHLG 2009 Technical Appendix A, Section 1.6 recommends that, where mathematical models are not available climate change flood extents can be assessed by using the Flood Zone B outline as a surrogate for Flood Zone A with allowance for the possible impacts of climate change. Therefore, the predicted 0.1% AEP flood level listed in above (51.99m OD) is considered to be representative of the 1% AEP (1 in 100 year) mid-range future climate change scenario.

Using the information obtained from the predicted flood level, in order to permit a sustainable development of this site and to mitigate against potential residual flood risk to the development it is recommended that the finished floor level for all units should be above a minimum level of 51.99+500mm freeboard = 52.49m OD. The minimum proposed finished floor level is 59.35m OD which is significantly higher than the required minimum finished floor level.

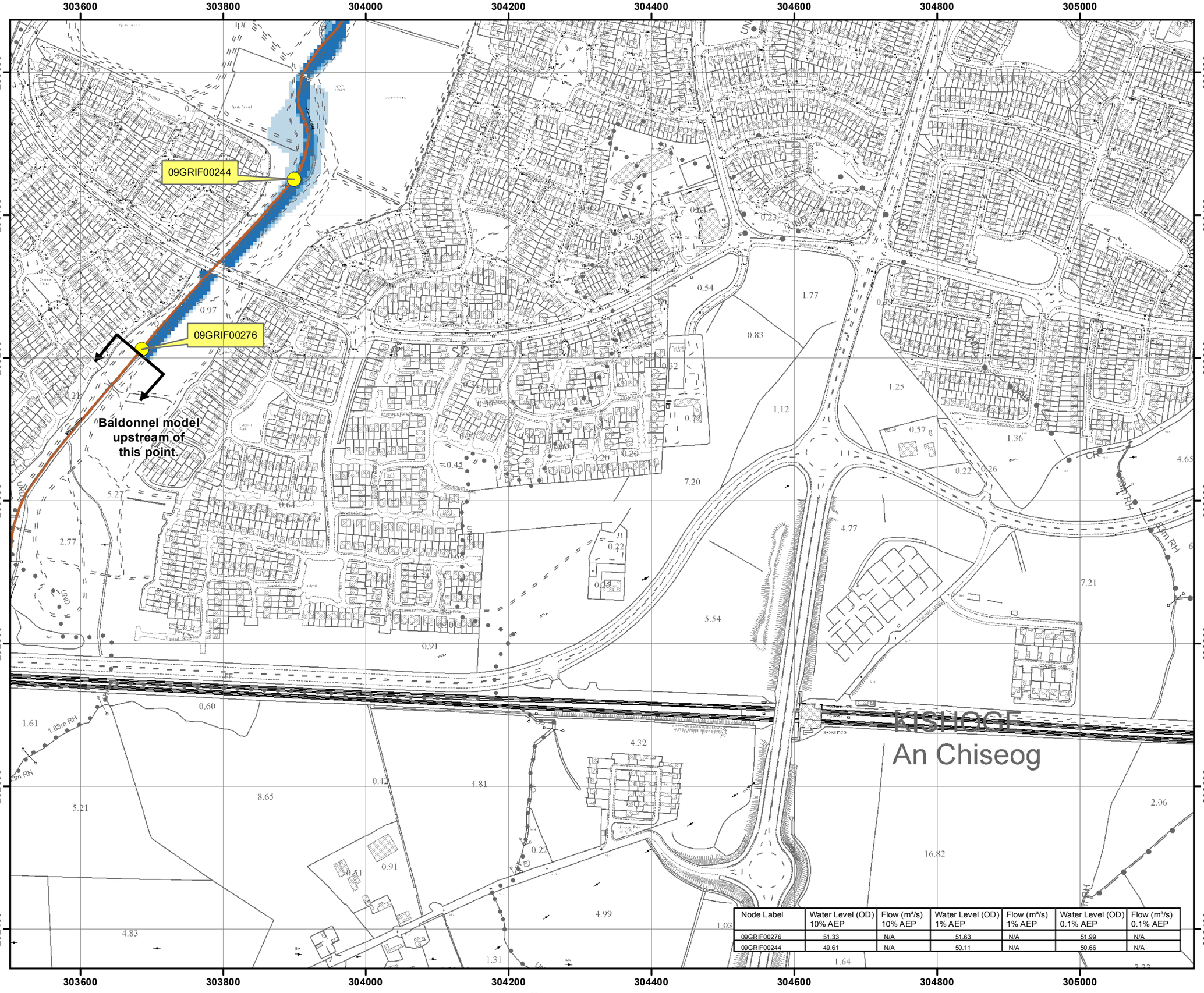
An analysis of OPW records indicates that the site is not at risk of flooding as a result of pluvial or tidal flood events.

In consideration of the above assessment, analysis and recommendations, overall development of the site is not expected to result in an adverse impact to the existing hydrological regime of the area or to result in an increased flood risk elsewhere.

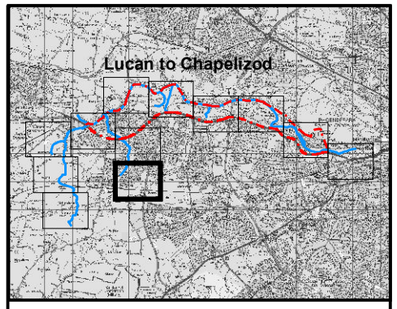
APPENDIX A – LAND USE ZONING MAP


LEGEND
SDZ BOUNDARY
PRIMARILY RESIDENTIAL
MIXED USE RESIDENTIAL
OPEN AREA
EXISTING BLOCKS
FLOOD ZONE A
FLOOD ZONE B

APPENDIX B – CFRAM FLUVIAL FLOOD EXTENTS MAP



Node Label	Water Level (OD) 10% AEP	Flow (m³/s) 10% AEP	Water Level (OD) 1% AEP	Flow (m³/s) 1% AEP	Water Level (OD) 0.1% AEP	Flow (m³/s) 0.1% AEP
09GRIF00276	51.33	N/A	51.63	N/A	51.99	N/A
09GRIF00244	49.61	N/A	50.11	N/A	50.66	N/A



IMPORTANT USER NOTE:
THE VIEWER OF THIS MAP SHOULD REFER TO THE DISCLAIMER, GUIDANCE NOTES AND CONDITIONS OF USE THAT ACCOMPANY THIS MAP.

Legend

- 10% Fluvial AEP Event
- 1% Fluvial AEP Event
- 0.1% Fluvial AEP Event
- Modelled River Centreline
- AFA Extents
- Node Point
- Node ID Node Label

FINAL

REV:	NOTE:	DATE:

EASTERN CFRAM STUDY
CATCHMENT FLOOD RISK ASSESSMENT AND MANAGEMENT

OPW
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Map:
Lucan to Chapelizod Fluvial Flood Extents

Map Type:	**EXTENT**		
Source:	**FLUVIAL**		
Map Area:	**HPW**		
Scenario:	**CURRENT**		
Drawn By :	**C.C.**	**Date :**	**27 July 2016**
Checked By :	**S.P.**	**Date :**	**27 July 2016**
Approved By :	**G.G.**	**Date :**	**27 July 2016**

Drawing No. :
E09LUC_EXFCD_F0_05

Map Series : Page 5 of 12

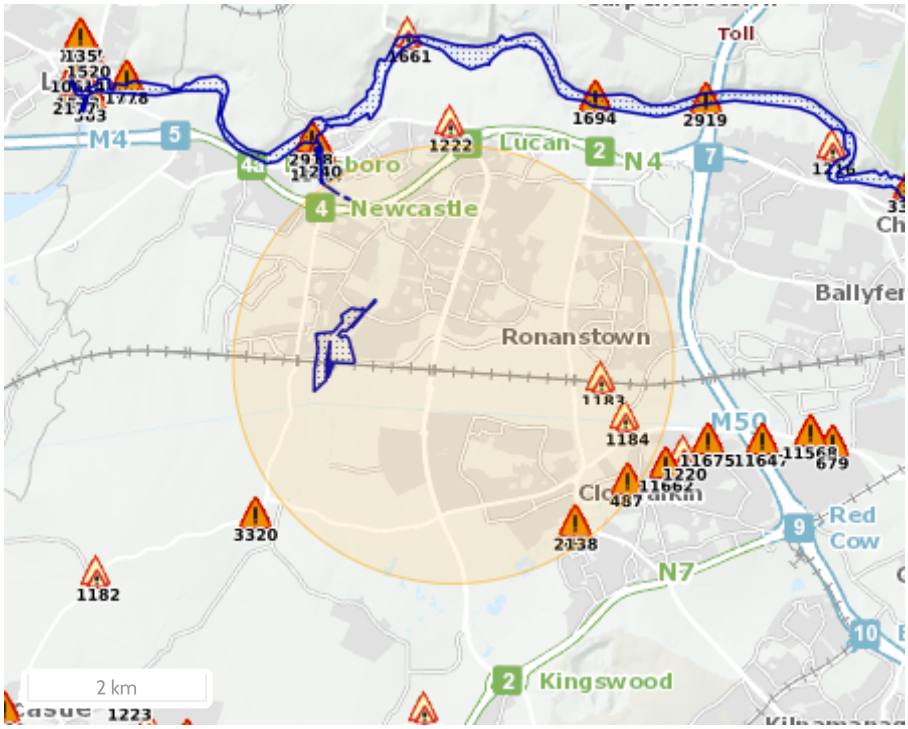
Drawing Scale : 1:5,000 @ A3

APPENDIX C – PAST FLOOD SUMMARY REPORT

Past Flood Event Local Area Summary Report

Report Produced: **31/5/2023 12:52**

This Past Flood Event Summary Report summarises all past flood events within 2.5 kilometres of the map centre.



Map Legend

- Single Flood Event
- Recurring Flood Event
- Past Flood Event Extents
- Drainage Districts Benefited Lands*
- Land Commission Benefited Lands*
- Arterial Drainage Schemes Benefited Lands*

* Important: These maps do not indicate flood hazard or flood extent. Their purpose and scope is explained on Floodinfo.ie

7 Results

	Name (Flood_ID)	Start Date	Event Location
1.	Camac Cherrywood Nov 1982 (ID-2138)	05/11/1982	Exact Point
	Additional Information: Reports (1) Press Archive (0)		
2.	Griffeen November 2000 (ID-1237)	05/11/2000	Area
	Additional Information: Reports (16) Press Archive (6)		
3.	Camac Clondalkin June 1993 (ID-487)	10/06/1993	Exact Point
	Additional Information: Reports (1) Press Archive (0)		
4.	Camac Cherrywood June 1993 (ID-488)	10/06/1993	Exact Point
	Additional Information: Reports (1) Press Archive (0)		
5.	Beech Row Ronanstown Recurring (ID-1183)	n/a	Approximate Point
	Additional Information: Reports (3) Press Archive (0)		
6.	Cappaghmore Ronanstown Recurring (ID-1184)	n/a	Approximate Point
	Additional Information: Reports (2) Press Archive (0)		

	Name (Flood_ID)	Start Date	Event Location
7.	Camac Cherrywood Feb 1994 (ID-1271)	04/02/1994	Approximate Point

Additional Information: Reports (1) Press Archive (0)

APPENDIX D – CSDZ COMPOSITE FLOOD MAP

APPENDIX

A Flood Zone Map