Document Title

Site Specific Flood Risk Assessment

Project

Clongriffin Wider Lands – Phase 2

Client

The Land Development Agency



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SITE SPECIFIC FLOOD RISK ASSESSMENT

CLONGRIFFIN WIDER LANDS – PHASE 2

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1.0 INTRODUCTION

1.1 Scope

Cronin & Sutton Consulting Engineers (CS Consulting) have been commissioned by the Land Development Agency (LDA) to prepare a Site Specific Flood Risk Assessment for the masterplan-led development of LDA lands at Clongriffin, Dublin 13.

In preparing this report, CS Consulting has made reference to the following:

- Dublin City Development Plan 2022–2028
  (including Strategic Flood Risk Assessment)
- Greater Dublin Strategic Drainage Study (GDSDS) 2005
- The Planning System and Flood Risk Management: Guidelines for Planning Authorities 2009 (Flood Risk Management Guidelines)
- Greater Dublin Regional Code of Practice for Drainage Works (Version 6)
- Irish Water Drainage and Supply Records
- Office of Public Works Flood Maps
- Geological Survey of Ireland Maps

The SSFRA is to be read in conjunction with the engineering drawings and documents submitted by CS Consulting and with all other relevant documentation submitted by other members of the project design team.

2.0 SITE LOCATION AND PROPOSED DEVELOPMENT

2.1 Site Location

The overall site comprises zoned development lands in Dublin 13 located to the west of Clongriffin railway station; the development site has a total area of 3.47ha. The subject development lands are bounded to the east by Clongriffin Road and Station Square, to the north by development lands and Park Street, and to the south by Clongriffin Main Street. The subject site is in the administrative jurisdiction of Dublin City Council (DCC), adjacent to the City Council's boundary with Fingal County Council.



Figure 1 – Location of subject lands
(sources: EPA, OSi, OSM Contributors, Google)

The location of the subject lands is shown in **Figure 1**; their extents and environs are shown in more detail in **Figure 2**.

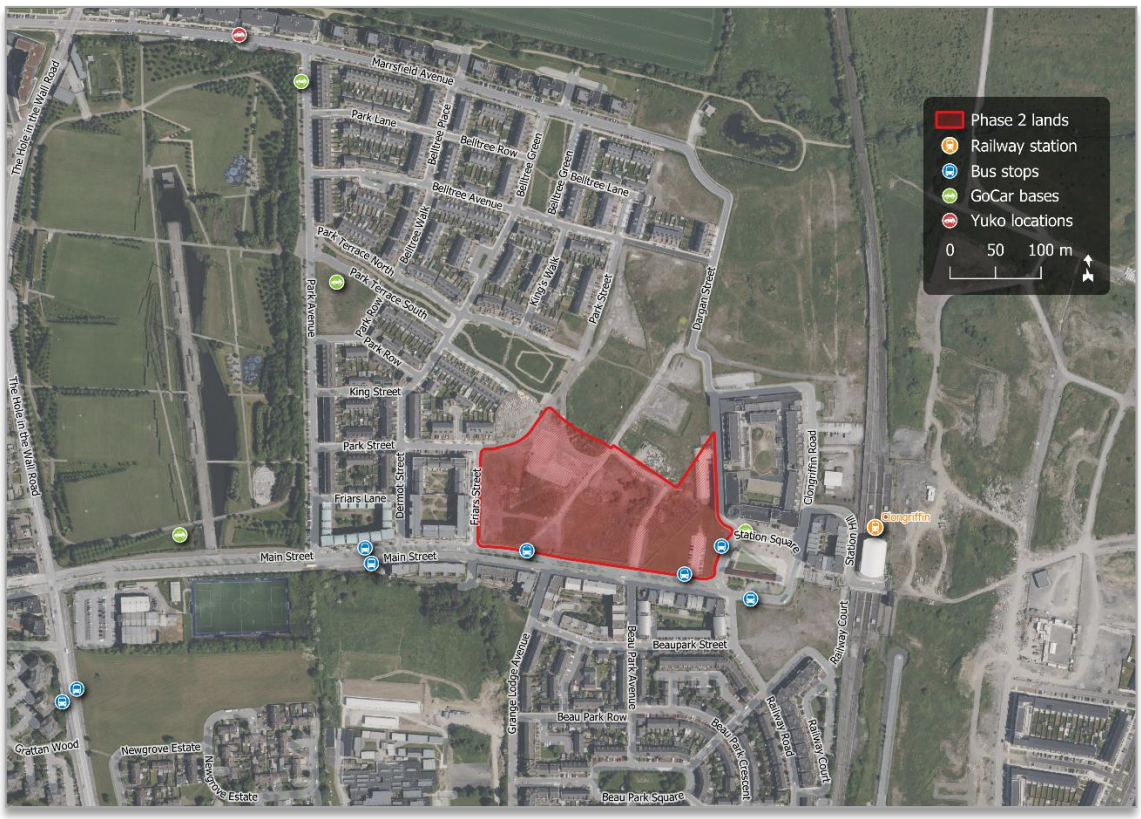


Figure 2 – Subject lands extents and environs
(sources: NTA, GoCar, Toyota, OSi, OSM Contributors, Microsoft)

2.2 Existing Clongriffin Development

Development of the wider Clongriffin area has thus far been carried out largely in accordance with a 10-year masterplan planning permission granted to Gannon Homes on the 27th of June 2003 under DCC Reg. Ref. 1302/02 (An Bord Pleanála ref. PL29N.131058). This provided for development consisting of a total of 3,576no. dwellings and 80,600m² of mixed retail, commercial, leisure, and community uses, associated car parking and engineering works, and provision for a new railway station.

These previously permitted development proposals (referred to hereafter as the 'masterplan parent permission') comprised:

- Services infrastructure including water supply, foul drainage, surface water drainage, and internal roads.
- A new access road to the development from the Hole in the Wall Road through Father Collins Park [Main Street] and a new east-west access road parallel to the Mayne River [Marrsfield Avenue].
- An underground town carpark and park and ride carpark (420no. spaces), taxi rank, drop off points, and a bus interchange associated with the railway station.

- Civic town squares and spaces, and a linear park along the south side of the Mayne River with attenuation pond.

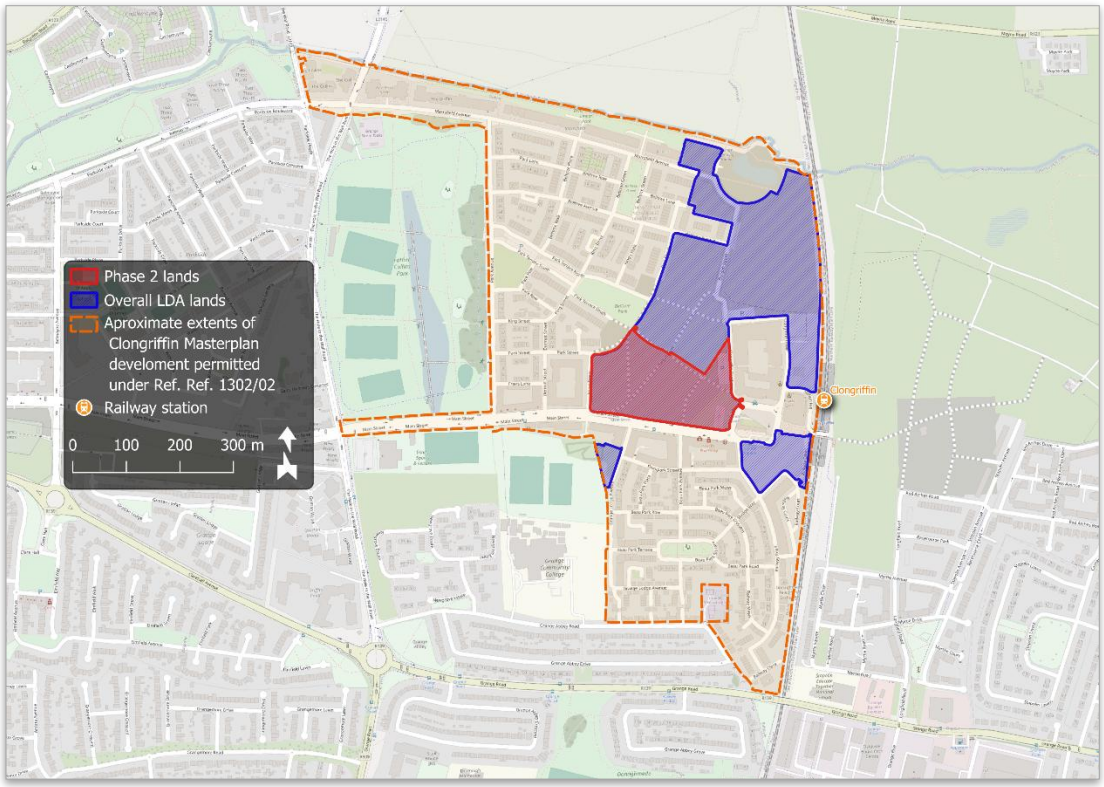


Figure 3 – Clongriffin masterplan extents and neighbourhoods
(sources: OSi, OSM Contributors)

2.3 Description of Proposed Development

The development will consist of the construction of a residential development set out in 3 no. blocks (identified as Zone 7, 8 & 9), ranging in height from 5 to 10 storeys, to accommodate 711 no. apartments including café/restaurant/retail units, community/cultural spaces, a standalone creche building and the completion of Market St.

The 3 no. residential buildings are arranged around podium courtyards accommodating communal amenity spaces for future residents. Zone 7 is a 5 to 7 storey block onto Main St, Friar's St, Park St and Market St containing 280 apartments. Zone 8 is a 6 to 8 storey block between Main St and Market Street containing 263 apartments. Zone 9 is a 6 to 10 storey block located on Main St, Station Square and Market Street containing 168 units.

Car and cycle parking for both residents and visitors is provided below podium and at surface level throughout the scheme. The proposed development includes all site landscaping works, open space, green roofs, lighting, servicing and utilities, signage, and associated and ancillary works, including site development works above and below ground.

The proposed development sits as part of a Masterplan for a wider Clongriffin landbank which includes the under-construction Block 5 & 6 to the north of Market Street.

For a more detailed description please refer to the Statutory Notices.

3.0 ASSESSMENT PROCEDURE AND FLOOD RISK ZONING

3.1 Source-Pathway-Receptor Model

As described in the Flood Risk Management Guidelines:

"The assessment of flood risk requires an understanding of where the water comes from (i.e. the source), how and where it flows (i.e. the pathways) and the people and assets affected by it (i.e. the receptors)."

The Source-Pathway-Receptor (S-P-R) model has become widely used to assess and inform the management of environmental risks. This is illustrated in **Figure 4** [1].

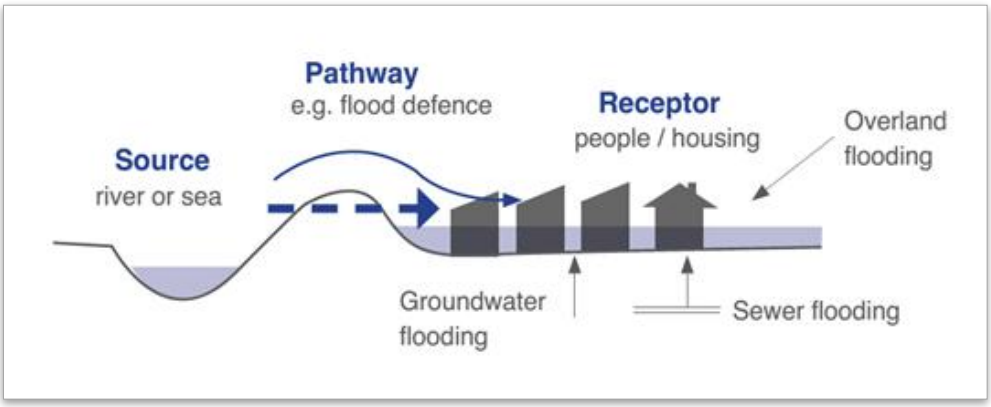


Figure 4 – Sources, pathways and receptors of flooding
(source: The Planning System and Flood Risk Management Guidelines)

The Flood Risk Management Guidelines further note that:

- The principal sources are rainfall or higher than normal sea levels.
- The principal pathways are rivers, drains, sewers, overland flow and river and coastal floodplains and their defence assets.
- The receptors can include people, their property and the environment.
- All three elements must be examined as part of the flood risk assessment including the vulnerability and exposure of receptors to determine its potential consequences.

[1] Figure 2.2 from the Flood Risk Management Guidelines

- Mitigation measures typically used in development management can reduce the impact on people and communities, for example, by blocking or impeding pathways but they have little or no effect on the sources of flooding.
- The planning process is primarily concerned with the location of receptors, taking appropriate account of potential sources and pathways that might put those receptors at risk.
- Risks to people, property and the environment should be assessed over the full range of probabilities, including extreme events.
- The flood risk assessment should cover all sources of flooding, including the effects of run-off from a development on flood risk both locally and beyond the development site.
- A staged approach should be adopted, carrying out only such appraisal and or assessment as is needed for the purposes of decision-making at the [relevant] level.

3.2 Expression of Flood Risk

There is an existing inherent risk of any flood event occurring during any given year. Typically, this likelihood of occurrence was traditionally expressed as a 1-in-100 chance of a 100-year storm event happening in any given year. A less ambiguous expression of probability is the Annual Exceedance Probability (AEP), which may be defined as the probability of a flood event being exceeded in any given year. Therefore a 1-in-100-year event has a 1% AEP; similarly, a 100% AEP can be expressed as a 1-in-1-year event.

The Planning System and Flood Risk Management, Guidelines for Planning Authorities (Flood Risk Management Guidelines), published in 2009 set out the best practice standards for flood risk assessment in Ireland. These are summarised in **Table 1** below (Table 8.1 from Flood Risk Management Guidelines document).

Development Category	Flooding Source		
	Drainage	River	Tidal/Coastal
Residential	1% AEP	0.1% AEP	0.1% AEP
Commercial	1% AEP	1% AEP	0.5% AEP
Water-compatible (docks, marinas)	-	>1% AEP	>0.5% AEP

Table 1: Summary of Level of Service: Flooding Source

3.3 Flood Risk Zoning

Under the Flood Risk Management Guidelines, a proposed development site has first to be assessed to determine the flood zone category it falls under. The guidelines define three distinct areas of combined flood risk: Zones A, B, and C. These are described below.

- **Zone A** – High Probability of Flooding.
  Where the average probability of flooding from rivers and sea is highest (greater than 1% AEP for fluvial flooding or 0.5% AEP for tidal flooding).
  Zone B – Moderate Probability of Flooding.
  Where the average probability of flooding from rivers and sea is moderate (between 0.1% AEP and 1% AEP for fluvial flooding, and between 0.1% AEP and 0.5% AEP for tidal flooding).
- **Zone C** – Low Probability of Flooding.
  All areas outside Zones A and B. Where the probability of flooding from rivers and sea is lowest (less than 0.1% AEP for both fluvial and coastal flooding).

Combined flood risk zone extents throughout Dublin City Council have been defined through modelling in the preparation of the Dublin City Council 2022-2028 Strategic Flood Risk Assessment (SFRA). A review of flood risk mapping contained within the *Dublin City Council 2022–2028 Strategic Flood Risk Assessment*, an extract of which is shown in **Figure 5**, indicates that the proposed development site is located within **Flood Zone C.** Please refer to **Appendix A** for detailed Dublin City Council Composite Flood Map.

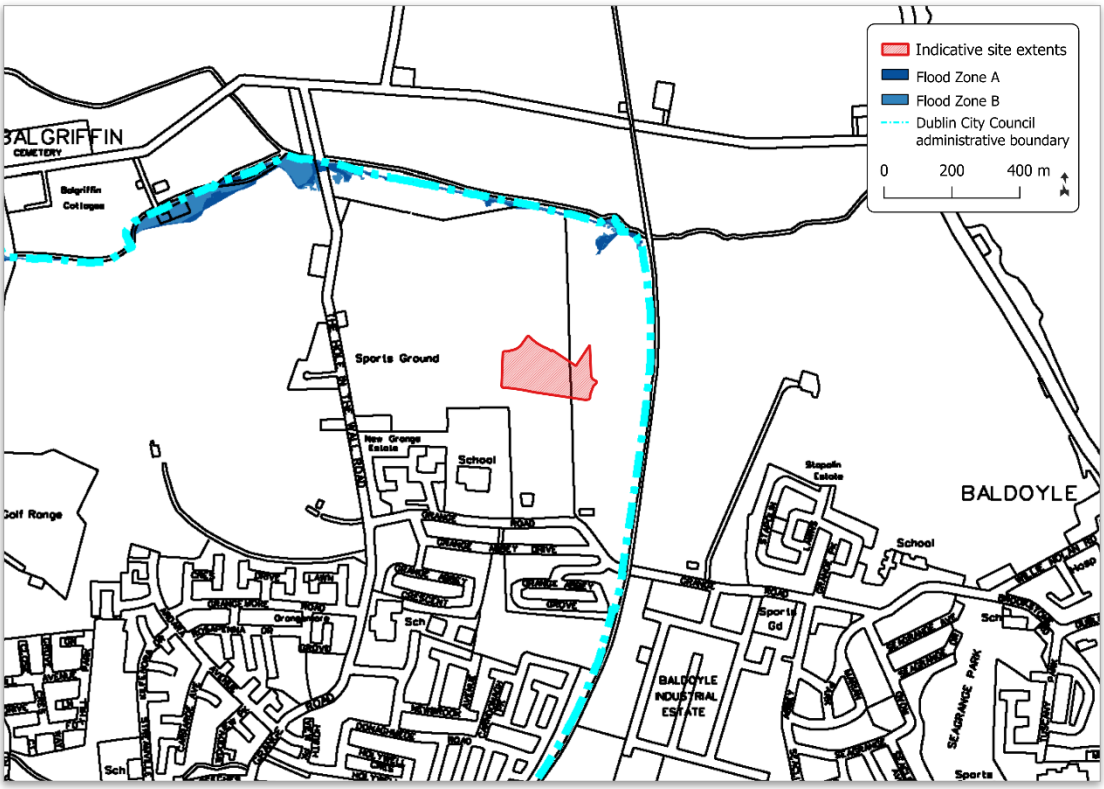


Figure 5 – Extract of DCC 2022-2028 SFRA Flood Risk Mapping
(sources: Dublin City Council)

3.4 Development Suitability and Justification

The Flood Risk Management Guidelines provide an 'appropriateness' matrix for various developments and their potential risk factors. This matrix, reproduced in **Table 2** below, indicates whether a development requires further analysis in the form of a justification test.

Development Category	Flood Zone A	Flood Zone B	Flood Zone C
Highly Vulnerable Development	Justification Test Required	Justification Test Required	Appropriate
Less Vulnerable Development	Justification Test Required	Appropriate	Appropriate
Water-compatible Development	Appropriate	Appropriate	Appropriate

Table 2: Flood Zone vs. Justification Test Matrix

As previously noted, the development site is located within **Flood Zone C**. The Flood Risk Management Guidelines classify residential development as 'highly vulnerable development. As such, a justification test is not required.

3.5 Allowance for Climate Change

The flood risk modelling underpinning the combined flood risk zones described in sub-section **3.3** and the source-specific FRAMS mapping described in sub-section **5.1** and sub-section **5.2** represents a default scenario (the Current Scenario) predicated on existing and historical meteorological conditions. The Office of Public Works (OPW) CFRAM guidance notes outline two additional potential future scenarios, which apply varying increases in flood parameters to account for the potential effects of climate change:

- Mid-Range Future Scenario (MRFS)
- High-End Future Scenario (HEFS)

The increases in the most influential flood parameters under these scenarios are given below in **Table 3**.

Flood Parameter	Applicable Increase by Scenario	
	MRFS	HEFS
Extreme Rainfall Depths	+20%	+30%
Peak Flood Flows	+20%	+30%
Mean Sea Level	+0.5m	+1.0m

Table 3: Allowances in Flood Parameters for the Mid-Range and High-End Future Scenarios

The Dublin City Council 2022-2028 Strategic Flood Risk Assessment stipulates that flood risk assessment must take into account climate change and associated impacts. It notes that:

'*From a plan making perspective, the Flood Zones for the current and future scenarios were compared with a view to identifying locations where climate change impacts could be significant, (i.e. where there was a significant difference between the current and future extents in both Flood Zone A and B). In locations where there was a difference in extents, further consideration was given to how development proposals could be managed in the processes contained in this SFRA. Consideration was also given to the presence or otherwise of flood defences, and where a flood relief scheme is ongoing or planned, it was noted that an adaptation plan would be an integral part of the scheme design. The findings of this assessment are noted in the relevant risk reviews in Appendices B and C*.'

4.0 PAST FLOODING EVENTS

A review of the Office of Public Works flood maps database (at www.floodinfo.ie) does not indicate any recorded historical instances of flooding on or near the proposed development, from any source. See **Figure 6** below and the OPW Past Flood Event Local Area Summary Report included as **Appendix B**.

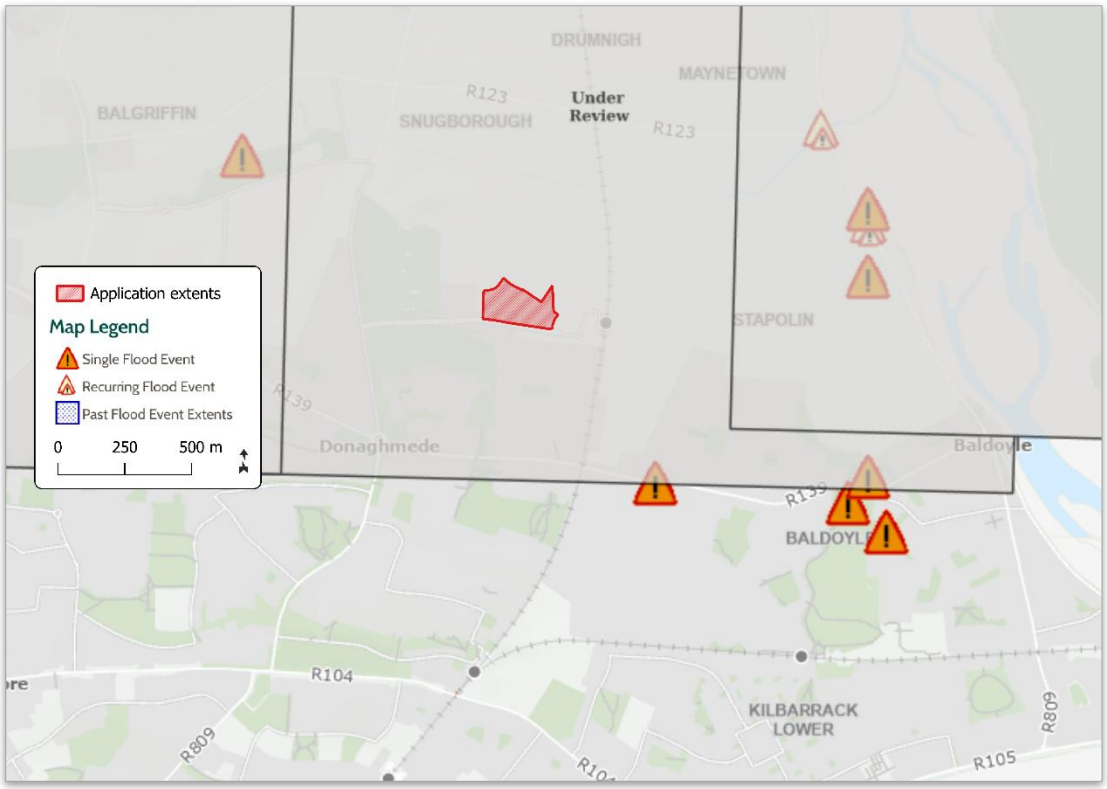


Figure 6 – OPW Mapping of Past Flood Events
(sources: www.floodinfo.ie)

5.0 SPECIFIC FLOOD RISKS

5.1 Fluvial Flooding

Recent modelling of the surrounding area as part of the *Fingal East Meath Flood Risk Assessment and Management Study (FRAMS)* project indicates that the subject site is outside of the area at risk from a 0.1% AEP fluvial flooding event. The relevant FRAMS fluvial flood extent map (as published at www.floodinfo.ie) is included within **Appendix C** to this report; an extract is shown in **Figure 7**.

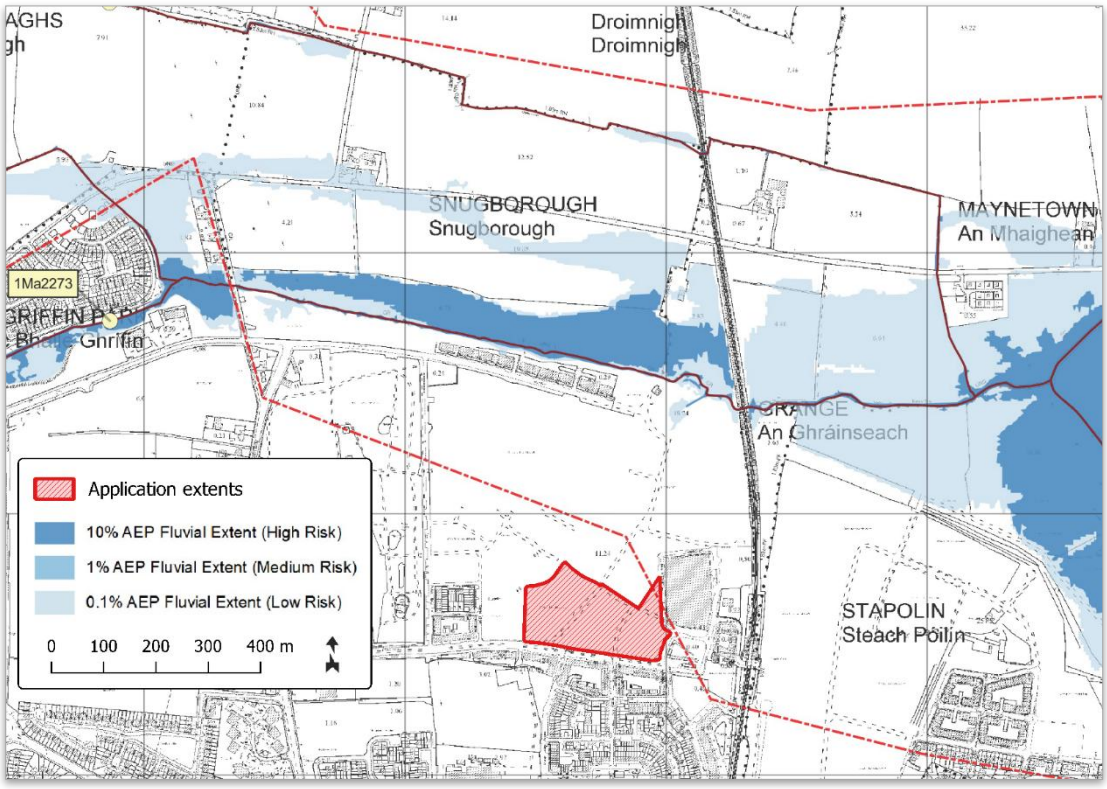


Figure 7 – FRAMS Mapping of Fluvial Flood Risk Extents
(sources: Office of Public Works)

In the 0.1% AEP fluvial flood event scenario (the lowest probability, most severe modelling scenario), the projected flooding extents reach no closer to the subject site than the Clongriffin attenuation pond. The normal water level within the pond is never more than 5.240m AOD, as this is the level of the top of the embankment surrounding it.

The most recent Flood Risk Assessment carried out in the area, completed as part of the Dart+ project, identifies an interpolated 1% AEP fluvial water level of 5.890 AOD at the existing bridge, which is located just east of the existing Clongriffin attenuation pond. Dart+ has also indicated proposals for a new bridge to be constructed further east of the pond, along the rail line. The assessment included a review and hydraulic modelling of flood levels in the vicinity of the

proposed bridge, which is located immediately east of the Clongriffin attenuation pond. Their analysis determined that the most conservative scenario for assessing the potential impact of the new bridge is the combined 0.1% AEP (1 in 1000 year) fluvial event with the 2% AEP (1 in 50 year) tidal event, as this joint-probability event produced the highest predicted flood level at the bridge section. The predicted flood levels at the proposed new bridge location are presented in **Figure 8**.

Design Event	Pre-development			Post-Development		
	Elevation at X-Section US of UBB19, m OD	Elevation at X-Section US of Proposed Arch Bridge, m OD	Elevation at X-Section DS of Proposed Arch Bridge, m OD	Elevation at X-Section US of UBB19, m OD	Elevation at X-Section US of Proposed Arch Bridge, m OD	Elevation at X-Section DS of Proposed Arch Bridge, m OD
Fluvial 1% + Tidal 5%	5.287	4.251	4.138	5.293	4.409	4.138
Fluvial 0.1% + 2% Tidal	5.557	4.338	4.227	5.557	4.518	4.227
Fluvial 10% + 0.5% Tidal	4.925	4.094	3.986	4.932	4.211	3.986
Fluvial 2% + 0.1% Tidal	5.188	4.203	4.082	5.188	4.304	4.082

Figure 8 – Pre and Post Bridge Development Flood Levels at Mayne River Crossing
(sources: Dart+ Project – Site Specific Flood Risk Assessment – July 2024)

Based on the worst-case joint probability design event, comprising the critical combination of fluvial and tidal influences, the modelled peak flood level in the vicinity of the pond is 5.557 AOD. A review of local topographical data indicates that the footpath to the north of the pond contains a local low point at 5.240 AOD, representing a 317mm exceedance relative to the predicted extreme flood level. Despite this difference in levels, the hydraulic assessment confirms that the pond will continue to function as intended, with overflow only occurring under the extreme combined fluvial–tidal event. Under such conditions, the peak water level within both the pond and the connected stormwater network is projected to reach 5.557 AOD. Importantly, no manhole cover levels within the network lie below this threshold. The lowest cover level is 6.160 AOD, providing 603mm of freeboard above the calculated peak flood level. This demonstrates that surcharge to ground level or uncontrolled exceedance flow pathways through the drainage network are not anticipated under the assessed design conditions.

In this fluvial flood modelling scenario, the highest possible water level of the subject site is therefore 5.557 AOD. The lowest finished floor level within the proposed development is at 7.400m AOD, providing a freeboard of 1843mm with respect to the most severe fluvial-tidal flood modelling scenario.

The risk of fluvial flooding impacting upon the subject development is therefore minimal, even during a 0.1% AEP (i.e. 1-in-1000-year) flooding event, and no specific additional mitigation measures are required.

It is noted that the FRAMS fluvial flood risk modelling results covering this area are currently under review by the OPW following the identification in 2018 of an error in the flood map source data. The nature and scale of this error have not been made public. Given the freeboard described above, it is however considered unlikely that any corrections made to the FRAMS fluvial flood risk model would result in a significant increase in flood hazard at the subject site.

An updated bathymetric survey of the pond area was carried out by Murphy Surveys to verify the ground levels I the vicinity of the pond.

5.2 Coastal Flooding

Recent modelling of the surrounding area as part of the *Fingal East Meath Flood Risk Assessment and Management Study* (FRAMS) project, the results of which are reproduced in **Figure 9**, indicates that the subject site is outside the area at risk from a 0.1% AEP tidal flooding event (i.e. a 1-in-1000-year occurrence).

Under even the highest-probability (10% AEP) coastal flood event scenario, floodwater extents are projected to reach no closer than a point approximately 150m north-east of the subject site. In the 0.1% AEP coastal flood event scenario (the lowest probability, most severe modelling scenario), the projected water level at this point is approximately 3.4m AOD. The lowest finished floor level (FFL) within the proposed development is at 7.4m AOD, providing a freeboard of 4.0m with respect to the most severe coastal flood modelling scenario.

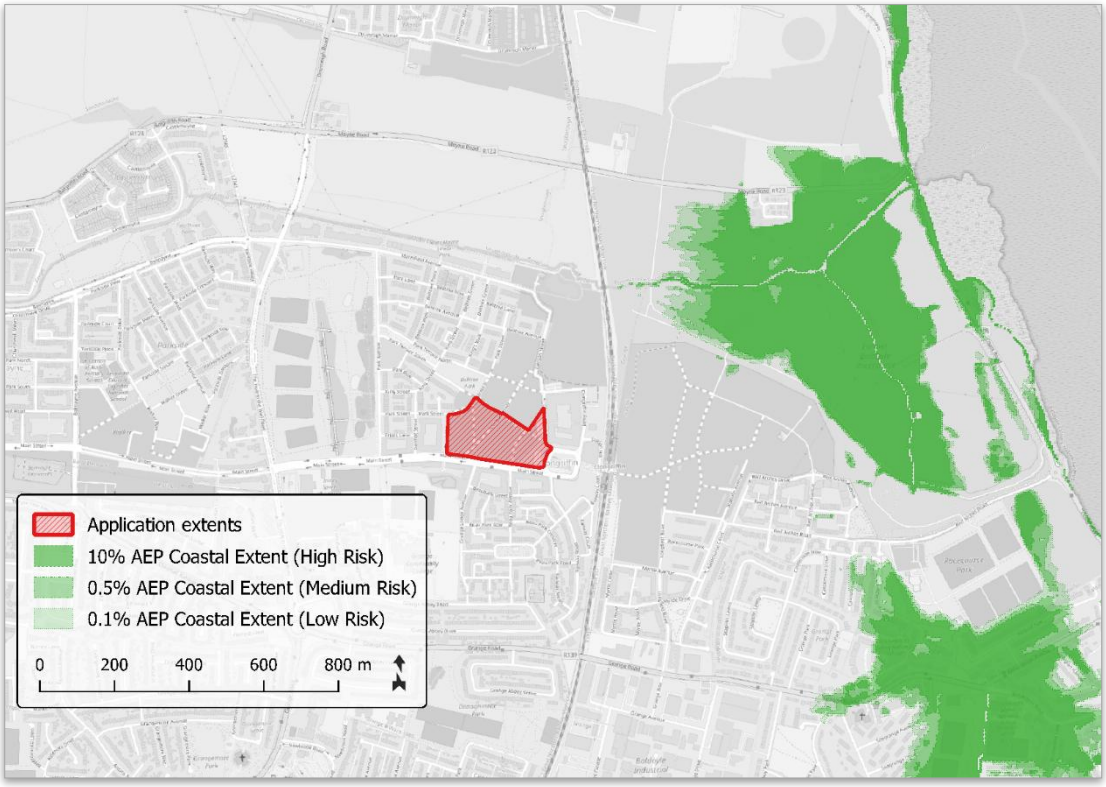


Figure 9 – FRAMS Mapping of Coastal (Tidal) Flood Risk Extents
(sources: Office of Public Works, OSM Contributors)

The risk of coastal flooding impacting upon the subject development is therefore negligible, even during a 1-in-1000-year flooding event, and no specific additional mitigation measures are required.

It is noted that the FRAMS coastal flood risk modelling results covering this area are currently under review by the OPW following the identification in 2020 of an error in the flood map source data. The nature and scale of this error have not been made public. Given the freeboard described above, it is however considered unlikely that any corrections made to the FRAMS coastal flood risk model would result in a significant increase in flood hazard at the subject site.

5.3 Pluvial Flooding

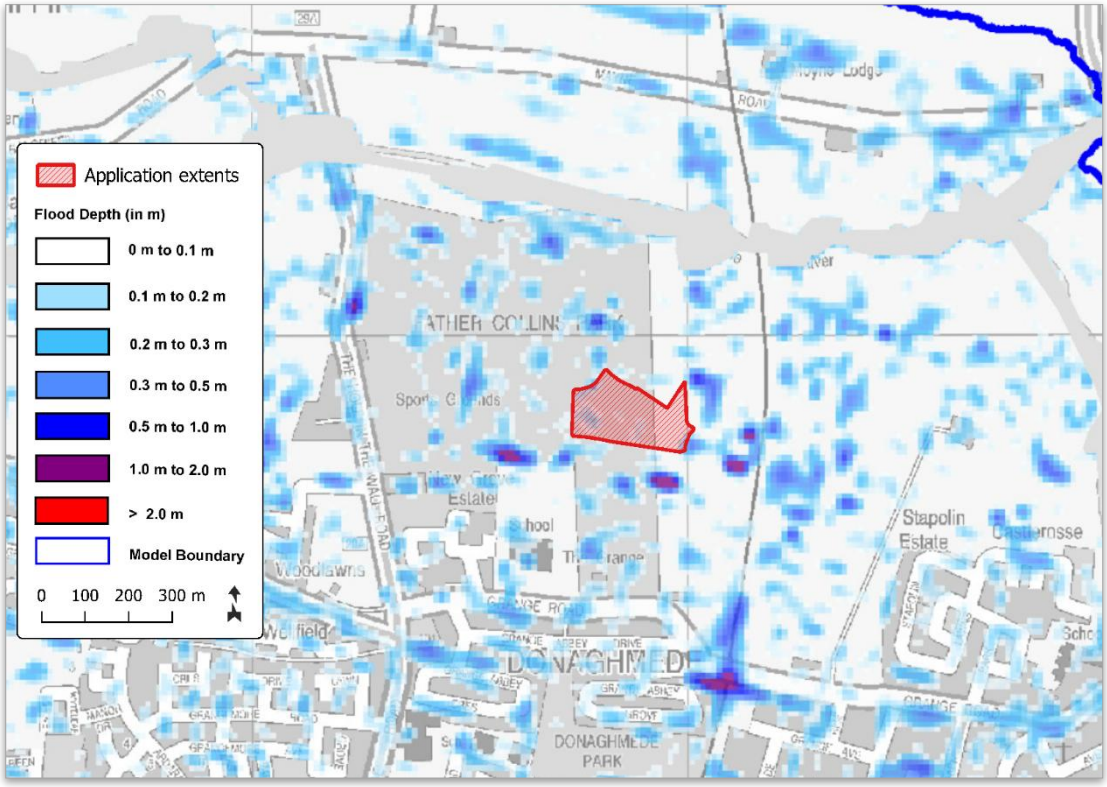


Figure 10 – Extract of DCC 2022-2028 SFRA Pluvial Flood Depth Mapping
(sources: Dublin City Council)

Pluvial flooding is flooding that has originated from overland flow resulting from high intensity rainfall. The *Dublin City Development Plan 2022–2028* Strategic Flood Risk Assessment includes a map of modelled pluvial flooding depths for a 3-hour duration rainfall event with 1% AEP. For such an event, the model indicates that the majority of the subject site is unlikely to experience significant pluvial flooding. However, the southern portion of the site may be subject to pluvial flooding with depths exceeding approximately 2m. This map is provided in **Appendix D** of this report, and an extract is shown in **Figure 10**.

It is worth noting that the proposed development shall be fitted with an attenuation storage system limiting storm water run-off, as described in the accompanying Surface Water Management Plan, and shall incorporate SuDS features that allow for rainwater retention and evaporation. These measures are expected to significantly mitigate the risk of pluvial flooding.

As previously described (see Section **4.0**), the OPW database of previous flooding events includes no records of flood events on or near the subject site. In view of the local topography, which is characterised by a general slight fall to the north, the subject site is deemed to be at no significant risk of pluvial flooding.

5.4 Groundwater Flooding

Geological Survey of Ireland (GSI) mapping (available at www.gsi.ie) indicates that the development site is underlain with argillaceous bioclastic limestone and shale of the Malahide Formation. The site is shown as overlaying a locally important bedrock aquifer that is "moderately productive only in local zones" and is in an area of low groundwater vulnerability. See Appendix D for GSI mapping of the area encompassing the development site.

Although within a limestone region, no karstic rock formations are recorded on or near the development site, and no instances of past groundwater flooding have been recorded. The development site is therefore considered at negligible risk of groundwater flooding.

Please refer to **Appendix E** for detailed GSI Geology and Hydrogeology Mapping.

6.0 POTENTIAL FOR DEVELOPMENT TO CONTRIBUTE TO OFF-SITE FLOODING

An existing local surface water drainage network serves the subject lands; this was designed and constructed as permitted under Reg. Ref. 0132/02. All runoff collected by this network drains to the Clongriffin attenuation pond, which is located adjacent to the Mayne River, at the northern boundary of the development site. The attenuation pond discharges to the Mayne River at a controlled rate of 249 l/s, as permitted under Reg. Ref. 0132/02. The attenuation pond was designed and sized to accommodate rainfall events exceeding a 1% Annual Exceedance Probability (AEP) and has over 6,400m^3 of attenuation storage on top of a permanent volume of approximately 2,500m^3.

In discussions with DCC Drainage Division, it has been discussed that surface water runoff from the proposed development shall be attenuated separate to this existing local surface water drainage network, this shall provide additional resilience and attenuation capacity. the proposed development shall outfall to Mayne River similar to the existing as described above.

Integration of the proposed development with this existing infrastructure ensures that stormwater runoff from the development site shall not flow into neighbouring sites but shall instead be collected and subsequently released in a controlled manner after the peak storm duration has passed. The risk of surface water runoff from the proposed development adversely affecting adjacent lands or contributing to downstream flooding is thereby mitigated.

7.0 CONCLUSIONS

This Site Specific Flood Risk Assessment has been carried out in accordance with the requirements of the national flood guidelines and Dublin City Council's Development Plan. Its conclusions are summarised as follows:

- The development site historically has no recorded flood events, as noted in the OPW's historical flood maps.
- Predicted flood hazard mapping for fluvial flood events shows that the development site is at low risk of flooding from this source.
- Predicted flood hazard mapping for coastal and pluvial flood events show that the development site is at low risk of flooding from these sources.
- The proposed development is in an area for which the risk of groundwater flooding is considered low.

The proposed development is deemed to be suitable for the site location, as historical and potential flood routes have been reviewed and the likelihood of the development being subject to flooding is low.

APPENDIX A

DUBLIN CITY COUNCIL FLOOD RISK MAPS



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Comhairle Cathrach Bhaile Átha Cliath
Dublin City Council

Dublin City Development Plan 2022-2028

Composite Flood Map for Dublin City Council

Note: The Composite Flood Map, and all other map extracts, illustrate Flood Zone A, B and Defended Areas (in red), where defended areas indicates lands defended to the 1% AEP fluvial and /or the 0.5% AEP tidal flood events and should therefore be considered also to be Flood Zone A.

Flood Zone A

Flood Zone B

Flood Zone C

Defended

City Boundary

Refer To OPW Website – Floodinfo.ie

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John O'Hara
Dublin City Planner

APPENDIX B

OPW PAST FLOOD EVENT LOCAL AREA SUMMARY REPORT



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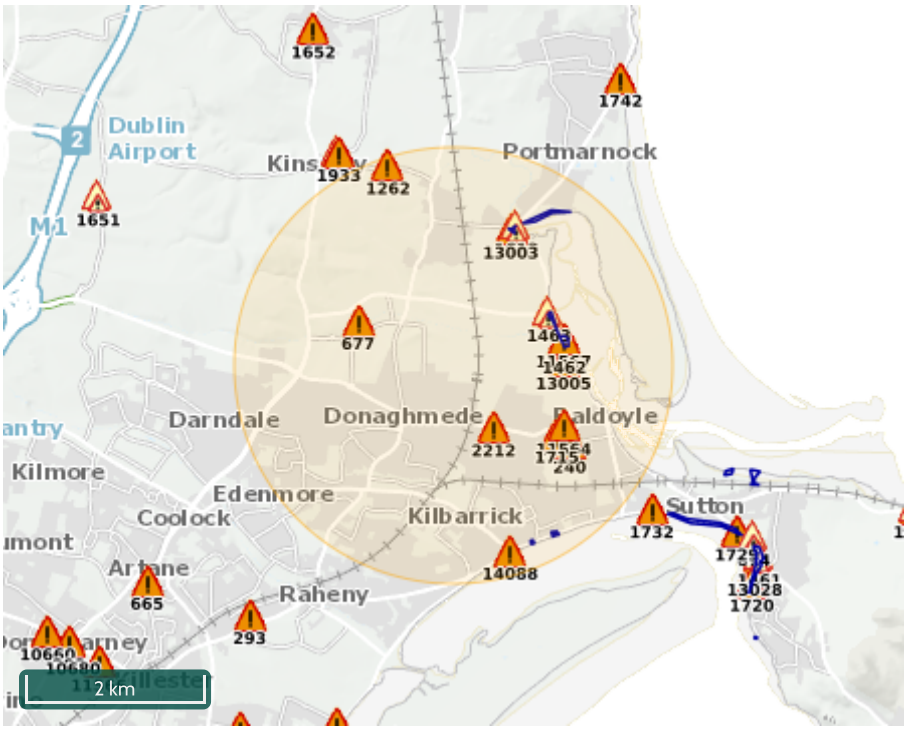
Civil, Structural & Traffic Engineering

Past Flood Event Local Area Summary Report

Report Produced: **13/5/2024 10:15**

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

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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

14 Results

	Name (Flood_ID)	Start Date	Event Location
1.	Flooding at Portmarnock on 03/01/2014 (ID-13003)	03/01/2014	Approximate Point
	Additional Information: Reports (0) Press Archive (0)		
2.	Flooding at Baldoyle on 03/01/2014 (ID-13005)	03/01/2014	Approximate Point
	Additional Information: Reports (0) Press Archive (0)		
3.	The Grange Road Baldoyle Oct 2002 (ID-1715)	19/10/2002	Exact Point
	Additional Information: Reports (1) Press Archive (0)		
4.	Grange Road Donaghmede Nov 1982 (ID-2212)	07/11/1982	Approximate Point
	Additional Information: Reports (1) Press Archive (0)		
5.	Grange Stream Baldoyle Dec 1954 (ID-240)	08/12/1954	Exact Point
	Additional Information: Reports (1) Press Archive (0)		
6.	Sluice River Strand Road Portmarnock Recurring (ID-1613)	n/a	Exact Point
	Additional Information: Reports (5) Press Archive (0)		

	Name (Flood_ID)	Start Date	Event Location
7.	Mayne Balgriffin Park June 1993 (ID-677) **Additional Information:** Reports (1) Press Archive (0)	10/06/1993	Approximate Point
8.	Baldoyle Coastal Recurring (ID-1462) **Additional Information:** Reports (5) Press Archive (0)	n/a	Approximate Point
9.	Mayne River Bridge Baldoyle Recurring (ID-1463) **Additional Information:** Reports (4) Press Archive (0)	n/a	Exact Point
10.	Flooding at Kilbarrack on 02/12/2021 (ID-14088) **Additional Information:** Reports (0) Press Archive (0)	02/12/2021	Approximate Point
11.	Dublin City Tidal Feb 2002 (ID-456) **Additional Information:** Reports (45) Press Archive (27)	01/02/2002	Area
12.	Flooding at Brookstone Road, Baldoyle, Dublin 13 on 24th Oct 2011 (ID-11564) **Additional Information:** Reports (1) Press Archive (0)	23/10/2011	Approximate Point
13.	Flooding at Coast Road, Baldoyle, Dublin 13 on 24th Oct 2011 (ID-11567) **Additional Information:** Reports (1) Press Archive (0)	23/10/2011	Approximate Point
14.	Sluice Kinsaley Hall August 1986 (ID-1262) **Additional Information:** Reports (1) Press Archive (0)	24/08/1986	Approximate Point

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APPENDIX C

FRAMS FLOOD RISK MAPPING



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Tidal flooding may also occur within area shown on this map.
Please refer to the tidal flood extent map. Figure No. MAY/HPW/EXT/CURS/T/003

1Mab2028

1Mac743D

1Ma2273

1Maa675

SAINTDOOLAGHS
Clochar Dúiligh

DRUMNIGH
Droimnigh
Droimnigh

SNUGBOROUGH
Snugborough

MAYNETOWN
An Mhaighean

BALGRIFFIN P.P.
Páirc Bhaile Ghriffin

GRANGE
An Ghráinseach

STAPOLIN
Steach Póilín

STAPOLIN
Steach Póilín

Node Label	Water Level (mOD) 10% AEP	Flow (m3/s) 10% AEP	Water Level (mOD) 1% AEP	Flow (m3/s) 1% AEP	Water Level (mOD) 0.1% AEP	Flow (m3/s) 0.1% AEP
1Ma2273	11.79	8.56	11.97	13.89	12.17	21.34
1Maa675	2.50	0.43	2.85	0.68	3.46	1.05
1Mab2028	12.62	0.47	12.82	0.87	13.10	1.55
1Mac743D	16.80	5.02	17.13	9.87	17.35	18.35

321500 322000 322500 323000 323500 324000 324500

242500 242000 241500 241000 240500

250 0 250 500 750 1000 Meters

Location Plan:



LEGEND

- AFA Boundary
- Defended Area
- Modelled River Centreline
- Node Point
- 10% AEP Fluvial Extent (High Risk)
- 1% AEP Fluvial Extent (Medium Risk)
- 0.1% AEP Fluvial Extent (Low Risk)
- Flood Defence - Embankment
- Flood Defence - Wall
- Gate
- NODE123 — Node Label
- x.x% AEP — Standard of Protection of Flood Defence

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

OPW
Oifig na nOibreacha Poiblí
The Office of Public Works

The Office of Public Works
Jonathan Swift Street
Trim
Co. Meath

Project:
FINGAL EAST MEATH FRAM STUDY

Map: **Mayne Model**
FLUVIAL FLOOD EXTENT MAP

Map Type:	EXTENT		
Source:	FLUVIAL		
Map Area:	HPW		
Scenario:	CURRENT		
Drawn by:	IH	Date:	Nov - 2017
Checked by:	JM	Date:	Nov - 2017
Approved by:	JM	Date:	Nov - 2017

Map No.:
MAY/HPW/EXT/CURS/003

Revision: F1

Map Scale: 1:10,000 Plot Scale: 1:1 @ A3

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321500 322000 322500 323000 323500 324000 324500

242500 242000 241500 241000 240500

SAINTDOOLAGHS
Clochar Dúiligh

DRUMNIGH
Droimnigh
Droimnigh

SNUGBOROUGH
Snugborough

MAYNETOWN
An Mhaighean

BALGRIFFIN PARK
Páirc Bhaile Ghrífín

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STAPOLIN
Steach Póilín

321500 322000 322500 323000 323500 324000 324500

250 0 250 500 750 1000 Meters

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Location Plan:



LEGEND

Modelled River Centreline

10% AEP Fluvial Flood Depth

- 0 - 0.25m
- 0.25 - 0.5m
- 0.5 - 1.0m
- 1.0 - 1.5m
- 1.5 - 2m
- > 2.0m

IMPORTANT USER NOTE:
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OPW
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The Office of Public Works

The Office of Public Works
Jonathan Swift Street
Trim
Co. Meath

Project:
FINGAL EAST MEATH FRAM STUDY

Map: **Mayne Model**
FLUVIAL FLOOD DEPTH MAP

Map Type:	DEPTH		
Source:	10% AEP FLUVIAL		
Map Area:	HPW		
Scenario:	CURRENT		
Drawn by:	IH	Date:	Sep - 2016
Checked by:	MC	Date:	Sep - 2016
Approved by:	JM	Date:	Sep - 2016

Map No.:
MAY/HPW/DEP/10/003

Revision: F0

Map Scale: 1:10,000 Plot Scale: 1:1 @ A3

321500 322000 322500 323000 323500 324000 324500

242500 242000 241500 241000 240500

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321500 322000 322500 323000 323500 324000 324500

250 0 250 500 750 1000 Meters

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Location Plan:



LEGEND

Modelled River Centreline

1% AEP Fluvial Flood Depth

- 0 - 0.25m
- 0.25 - 0.5m
- 0.5 - 1.0m
- 1.0 - 1.5m
- 1.5 - 2m
- > 2.0m

IMPORTANT USER NOTE:
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OPW
Oifig na nOibreacha Poiblí
The Office of Public Works

The Office of Public Works
Jonathan Swift Street
Trim
Co. Meath

Project:

FINGAL EAST MEATH FRAM STUDY

Map:

Mayne Model
FLUVIAL FLOOD DEPTH MAP

Map Type:	DEPTH		
Source:	1% AEP FLUVIAL		
Map Area:	HPW		
Scenario:	CURRENT		
Drawn by:	IH	Date:	Sep - 2016
Checked by:	MC	Date:	Sep - 2016
Approved by:	JM	Date:	Sep - 2016
Map No.:	MAY/HPW/DEP/100/003		
Revision:	F0		
Map Scale:	1:10,000	Plot Scale:	1:1 @ A3

321500 322000 322500 323000 323500 324000 324500

242500 242000 241500 241000 240500

SAINTDOOLAGHS
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DRUMNIGH
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An Ghráinseach

STAPOLIN
Steach Póilín

STAPOLIN
Steach Póilín

321500 322000 322500 323000 323500 324000 324500

250 0 250 500 750 1000 Meters

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Location Plan:



LEGEND

Modelled River Centreline

0.1% AEP Fluvial Flood Depth

- 0 - 0.25m
- 0.25 - 0.5m
- 0.5 - 1.0m
- 1.0 - 1.5m
- 1.5 - 2m
- > 2.0m

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

The Office of Public Works
Jonathan Swift Street
Trim
Co. Meath

Project:

FINGAL EAST MEATH FRAM STUDY

Map:

Mayne Model
FLOOD DEPTH MAP

Map Type:	DEPTH		
Source:	0.1% AEP FLUVIAL		
Map Area:	HPW		
Scenario:	CURRENT		
Drawn by:	IH	Date:	Sep - 2016
Checked by:	MC	Date:	Sep - 2016
Approved by:	JM	Date:	Sep - 2016

Map No.:
MAY/HPW/DEP/1000/003

Revision: F0

Map Scale: 1:10,000 Plot Scale: 1:1 @ A3

APPENDIX D

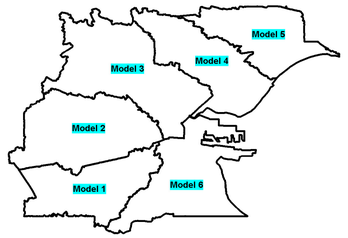
DUBLIN CITY COUNCIL PLUVIAL FLOOD DEPTH MAP



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Flood Depth Map



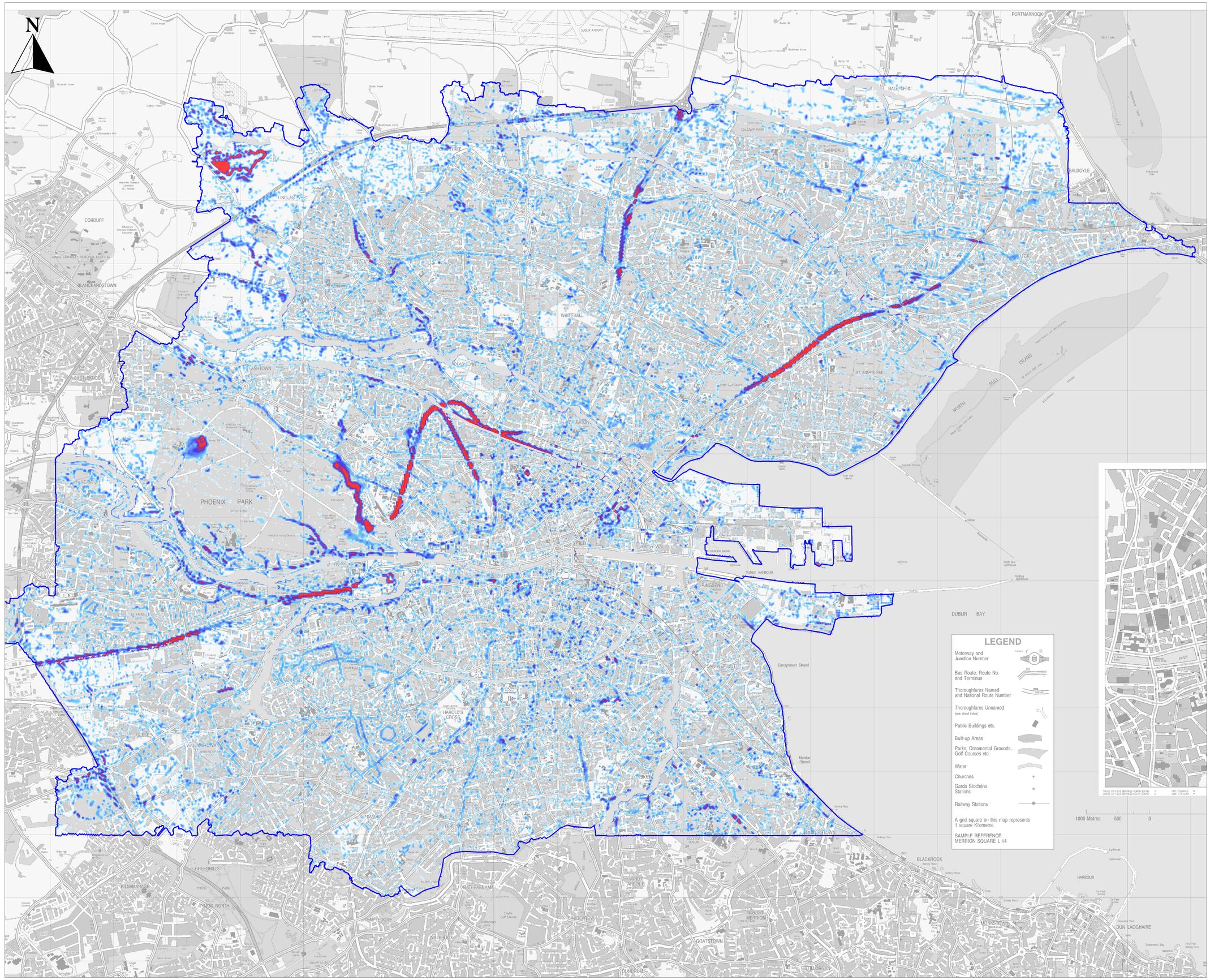
Dublin City Model boundaries

Legend

Flood Depth (in m)

- 0 m to 0.1 m
- 0.1 m to 0.2 m
- 0.2 m to 0.3 m
- 0.3 m to 0.5 m
- 0.5 m to 1.0 m
- 1.0 m to 2.0 m
- > 2.0 m
- Model Boundary

Notes



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JACOBS

Client	Dublin City Baile Átha Cliath
Project	**FloodResilienCity Project**
Title	**Type 1 Model - Flood Depth Map Dublin - 1% AEP Event - 3hr Duration**
Drawing Status	DRAFT
Job No.	32102500
Figure No.	32102500/D/OV/FD/0010
Revision	0
Scale	
Date :	

Drawn	MM	Checker	MV	Review	PS	Approved	CF

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Merrion House, Merrion Road, Dublin 4

APPENDIX E

GSI GEOLOGY AND HYDROGEOLOGY MAPPING

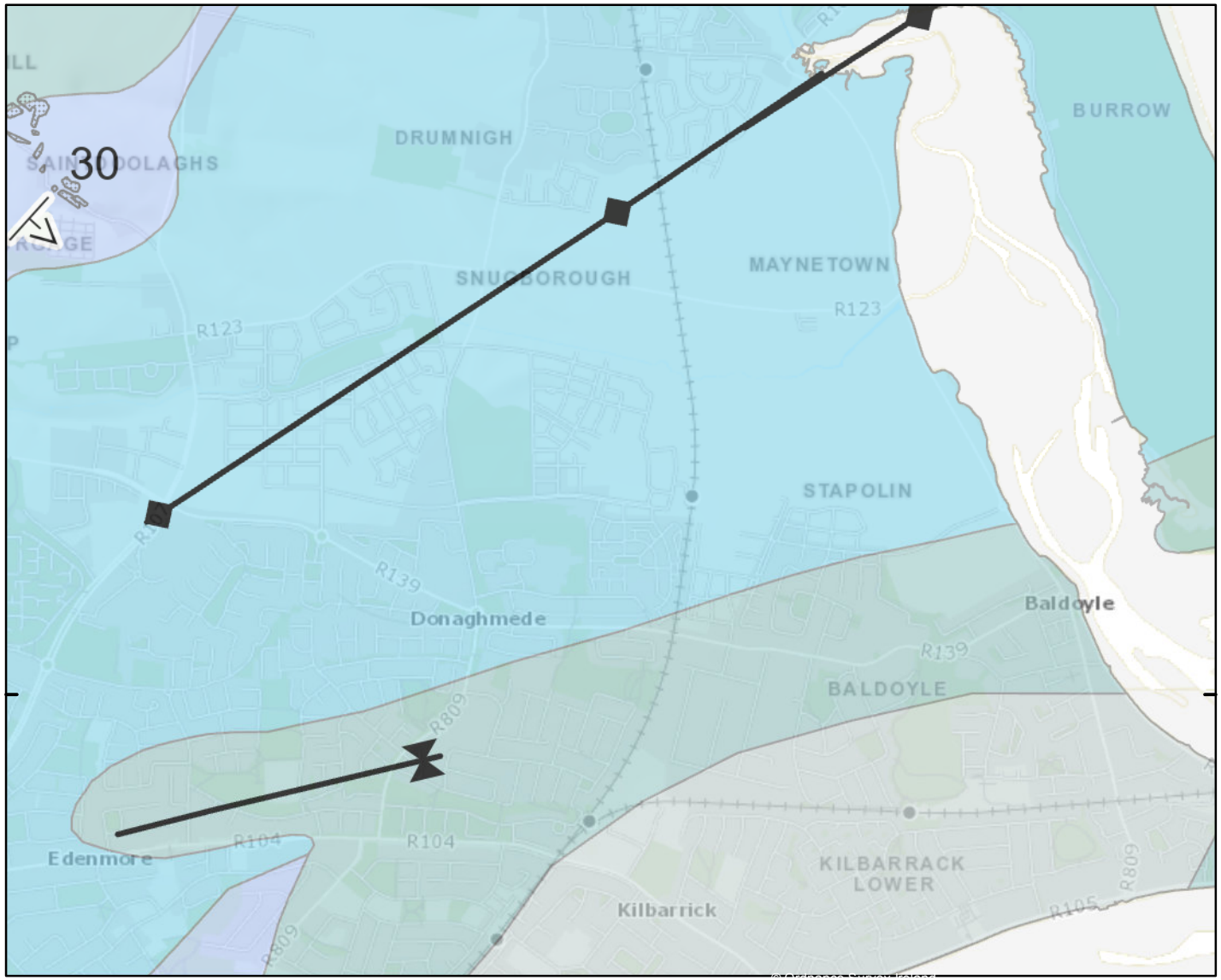


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C216 Bedrock Geology



Legend

Structural Symbols 100K ITM 2018

- Dip of bedding or main foliation, old GSI data
- First foliation parallel to bedding
- Foliation trend, Thorr and Rosses Granites
- Horizontal Bedding
- Strike and dip of bedding, right way up
- Strike and dip of bedding, way up unknown
- Strike and dip of first foliation
- Strike and dip of overturned bedding
- Strike and dip of second foliation
- Strike and dip of third foliation
- Strike and plunge of first generation fold axis
- Strike and plunge of second generation fold axis
- Strike and plunge of third generation fold axis
- Strike of vertical bedding/foliation
- Strike of vertical first foliation
- <all other values>

- Bedrock Outcrops 100 ITM 2018

Bedrock Linework 100k ITM 2018

- Anticlinal Axis
- Antiformal axis
- Aquifer Boundary
- Area
- Coal seam
- Dyke
- Fault
- Ghost Line
- Goniatite marine band (R1-R4)
- Lithological boundary offshore
- Metadolerite sheet, mainly sills
- Paleogene/ Tertiary Dyke
- Synclinal Axis
- Synformal axis
- Tectonic Slide, barbs on hanging-wall
- Thin stratigraphical unit, diagrammatic
- Thrust, barbs on hanging-wall side
- Tuff band
- Unconformity, dots on younger side
- X-Section

Scale: 1:25,000

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N W E S

0 0.175 0.35 0.7 mi

0 0.275 0.55 1.1 km



Map Centre Coordinates (ITM) 722,773 740,790

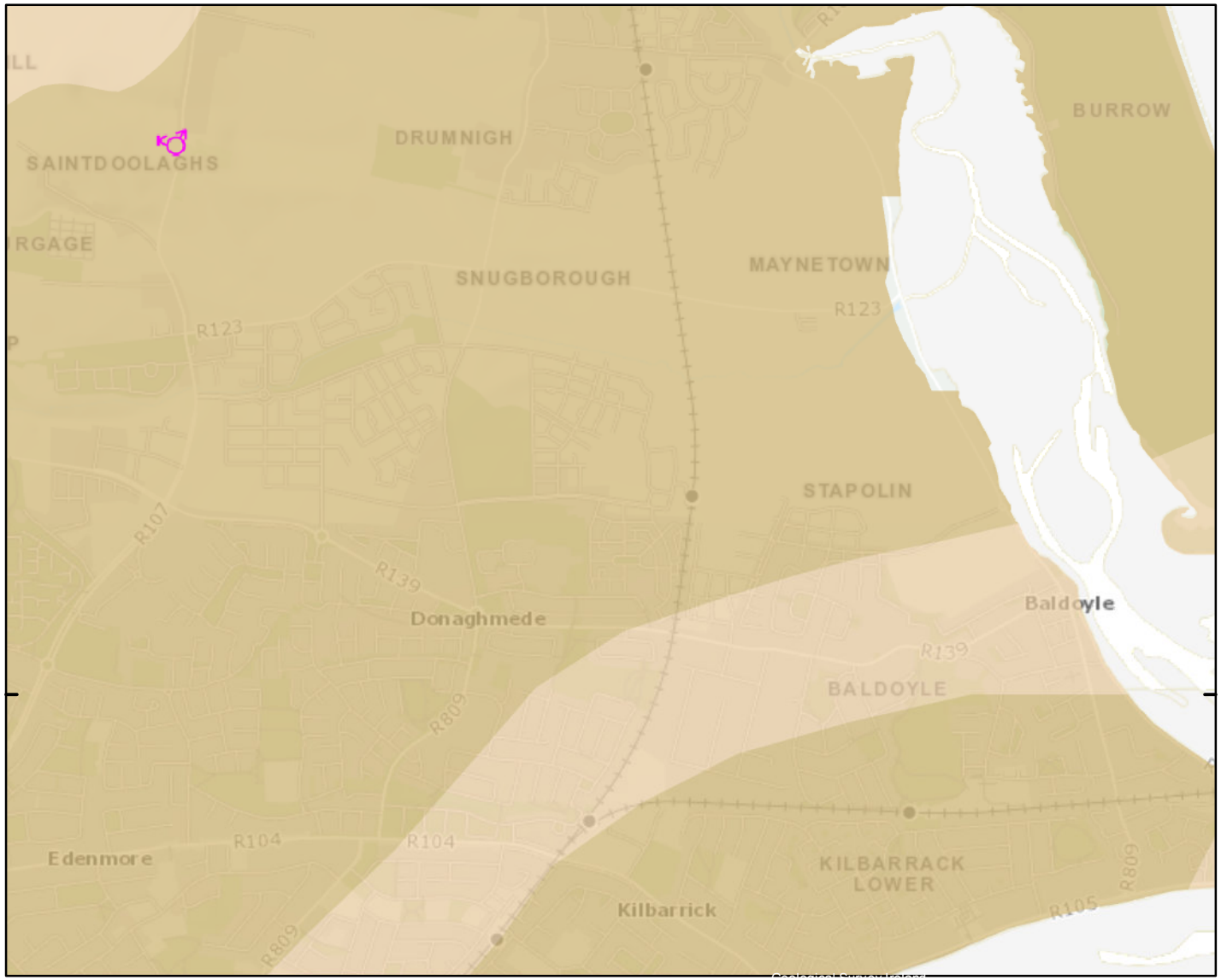
13/5/2024, 13:09:05

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C216 Groundwater Resources



Legend

IE_GSI_Karst_Landforms_4...

- Borehole
- Cave
- Dry Valley
- Enclosed Depression
- Estavelle
- Spring
- Superficial Solution Feature
- Swallow Hole
- Turlough

IE_GSI_Traced_U...

IE_GSI_Sand_and_Gr...

- Regionally important gravel aquifer
- Locally important gravel aquifer

IE_GSI_Aquifer_G...

Scale: 1:25,000

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N W E S

0 0.175 0.35 0.7 mi

0 0.275 0.55 1.1 km



Map Centre Coordinates (ITM) 722,773 740,790

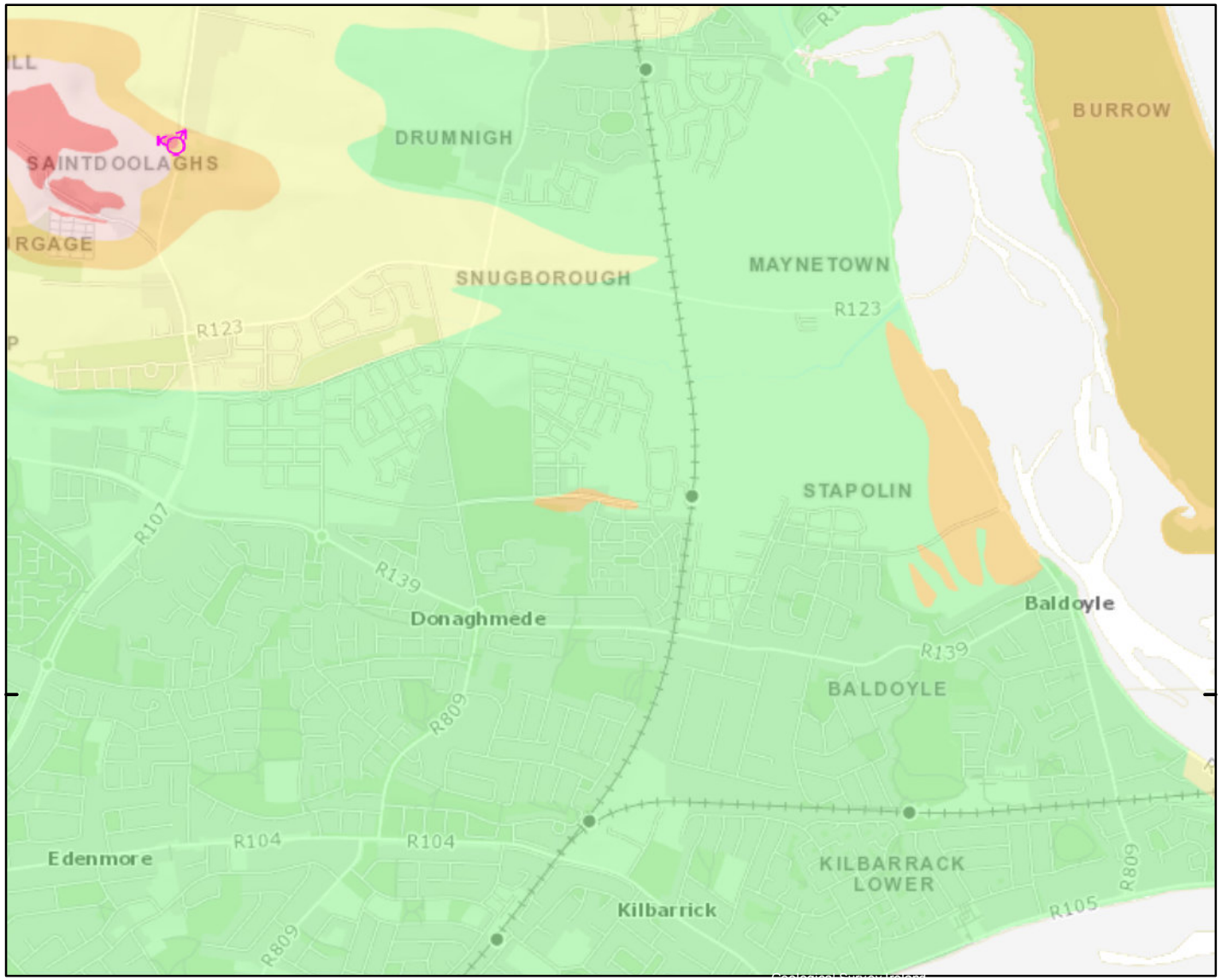
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C216 Groundwater Vulnerability



Legend

IE_GSI_Karst_Landforms_4...

- Borehole
- Cave
- Dry Valley
- Enclosed Depression
- Estavelle
- Spring
- Superficial Solution Feature
- Swallow Hole
- Turlough

IE_GSI_Traced_U...

IE_GSI_Groundwater_...

- Rock at or near Surface or Karst
- Extreme
- High
- Moderate
- Low
- Water

Scale: 1:25,000

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0 0.175 0.35 0.7 mi

0 0.275 0.55 1.1 km

Map Centre Coordinates (ITM) 722,773 740,790

13/5/2024, 13:07:36

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