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Site Specific Flood Risk Assessment

Proposed Residential Development

Belgard Square, Tallaght, Dublin 24

Client: South Dublin County Council

Job No. C186

July 2020

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SITE SPECIFIC FLOOD RISK ASSESSMENT

PROPOSED RESIDENTIAL DEVELOPMENT, BELGARD SQUARE, TALLAGHT, DUBLIN 24

CONTENTS

File Location: j:\c_jobs\job-c186\b_documents\c_civil\a_cs reports\fra\tal-csc-zz-xx-rp-c-0102_fra.docx

BS 1192 FIELD	**TAL-CSC-ZZ-XX-RP-C-0102_FRA**

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1.0 INTRODUCTION

Cronin & Sutton Consulting Engineers (CS Consulting) have been commissioned by South Dublin County Council (SDCC) to prepare a Site Specific Flood Risk Assessment to accompany a planning application for a residential development at Belgard Square, Tallaght, County Dublin.

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

- South Dublin County Council Development Plan 2016–2022; (including Strategic Flood Risk Assessment)
- Greater Dublin regional Code of Practice for Works;
- Office of Public Works Flood Maps;
- Department of the Environment Flooding Guidelines;
- Geological Survey of Ireland Maps;
- Local Authority Drainage Records.

The Site Specific Flood Risk Assessment has been carried out in accordance with '*Planning System and Flood Risk Management – Guidelines for Planning Authorities (2009)"* and is to be read in conjunction with the engineering drawings and documents submitted by CS Consulting and with the various additional information submitted by the other members of the design team, which forms part of the Planning Submission.

2.0 SITE LOCATION AND PROPOSED DEVELOPMENT

2.1 Site Location

The proposed development site is located to the south of Cookstown Road and Fourth Avenue and to the North of Belgard Square North, Tallaght, Co. Dublin. The site is located in the REGEN site zoning in the Tallaght Town Centre Local Area Plan and has a total area of approximately 0.49ha.

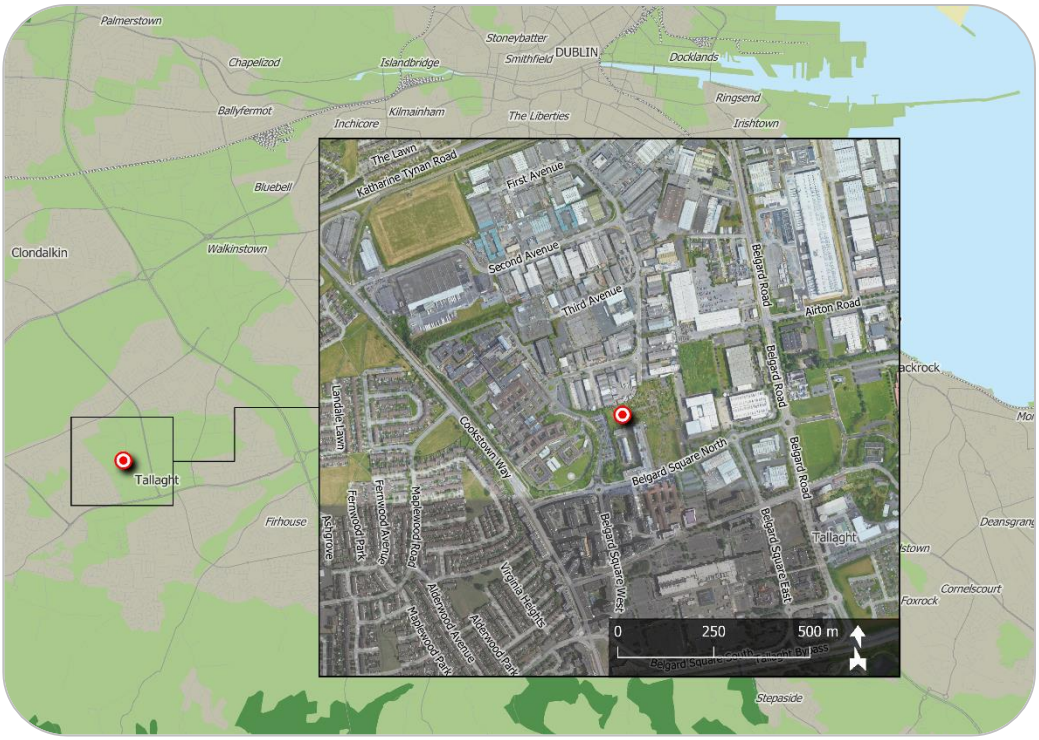

Figure 1 – Location of proposed development site
(*map data & imagery: EPA, OSM Contributors, Google*)

The location of the proposed development site is shown in Figure 1 above; the indicative extents of the development site, as well as relevant elements of the surrounding road network, are shown in more detail in Figure 2.

The site is bounded to the north by an existing industrial area, to the east by a link road between Belgard Square to Cookstown Road, to the south by

apartment block (Exchange Hall) and an access road to this apartment block, and to the west by Tallaght Hospital car park.

Figure 2 – Site extents and environs
(*map data & imagery: NTA, GoCar, OSM Contributors, Google*)

2.2 Existing Land Use

The development site is formerly a temporary halting site known as "Maelruan". The site is currently being used as a compound by the Contractor currently carrying out construction works of the Belgard Square to Cookstown link road.

2.3 Proposed Development

The development will consist of the construction of 133no. affordable rental apartments with a community facility (c 11,430m2) in two blocks ranging from six to eight storeys linked by a single storey podium containing a three

storey block with associated balconies/ terrace for each apartment and roof mounted solar panels.

Block A (west- c 5,170m2) accommodates 2 no. studios, 31 no. 1 bed apartments and 28 no. 2 bed apartments.

Block B (east – c 5,900m2) accommodates 1 no. studio, 33 no. 1 bed apartments, 35 no. 2 bed apartments and 1 no. 3 bed apartment.

Block C (podium – 360m2) accommodates 2 no. 3 bed apartments laid out over 3 floors.

The podium accommodates 39 no. car parking spaces which includes 3 no. universal access spaces, 246 no. bicycle spaces, ESB substation and switch room, plant spaces, bins and other stores.

Ancillary site development works include the provision of pedestrian zip link/ greenway, access roadway, footpaths, 26 no. bicycle spaces, hard and soft landscaping, new boundary treatments and a landscaped courtyard at podium level.

3.0 PROCESS FOR SITE SPECIFIC FLOOD RISK ASSESSMENT

The initial stage of the Site Specific Flood Risk Assessment (SSFRA) comprises an assessment of available flood risk data in order to identify flood risk indicators in the Study Area. If the site is identified to be at risk of flooding, the SSFRA will proceed to a detailed assessment.

3.1 POTENTIAL SOURCES OF FLOOD RISK

The Study Area is subject to the four potential flood risk mechanisms described below:

- Fluvial: flooding caused by overtopping of Rivers and Streams;
- Tidal: flooding caused by coastal sea level rises
- Pluvial: flooding caused when the intensity of rainfall events is such that the ground cannot absorb rainfall run-off effectively or urban drainage systems cannot carry the runoff generated;
- Groundwater: flooding caused by a rise in the level of the water table;
- Infrastructure failure.

3.2 FLOOD RISK INDICATORS

Indicators of flood risk are identified using available data, most of which is historically derived. Typically, this data is not prescriptive in relation to flood return periods and neither predictive nor inclusive of climate change analysis.

Flood risk indicators include:

- Records available on the Office of Public Works National Flood Risk Website. As part of the National Flood Risk Management Policy, the OPW developed the www.floodmaps.ie web-based data set, which contains information concerning historical flood data and displays

related mapped information and provides tools to search for and display information about selected flood events;

- CFRAM mapping produced under the OPW CFRAM programme;
- Geological Survey of Ireland (GSI) mapping - Hydrogeological mapping maintained by the GSI and made available through its website www.gsi.ie;
- Ordnance Survey mapping - Ordnance Survey maps include areas which are marked as being "Liable to Floods". Generally, these areas are only shown identified indicatively and suggest historical flooding, usually recurrent. In addition, the maps indicate areas of wet or hummocky ground, bog, marsh, springs, rises and wells as well as surface water features including rivers, streams, bridges, weirs and dams. Figure 4.1 shows the historic 6" OS mapping for the Study Area;
- Topographical survey information;
- Ground Investigation information.

4.0 LEVEL OF SERVICE

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 return period of 1% AEP flood event, 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 set out the best practice standards for flood risk assessment in Ireland. These are summarized in Table 1.

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

Under these guidelines a proposed development site has first to be assessed to determine the flood zone category it falls under.

It is a requirement of both South Dublin County Council, Greater Dublin Strategic Drainage Study, (DCC 2005) & the Department of the Environment, community & Local Government flooding guidelines, The Planning System and Flood Risk Management, Guidelines for Planning Authorities, that the predicted effects of climate change are incorporated

into any proposed design. Table 2 below indicates the predicted climate change variations.

Design Category	Predicted Impact of Climate Change
Drainage	10% Increase in rainfall
Fluvial (River flows)	10% Increase in flood flow
Tidal / Coastal	Minimum Finished Floor Level 4.0 – 4.15m AOD

Table 2 - The predicted climate change variations.

The flooding guidelines categorize the risks associated with flooding into three areas, Zone A, B & C. This categorisation is indicated below.

- **Zone A** – High Probability of Flooding. Where the average probability of flooding from rivers and sea is highest (greater than 1% annually or 1 in 100 for river flooding or 0.5% annually or 1 in 200 for coastal flooding).
- **Zone B** – Moderate Probability of Flooding. Where the average probability of flooding from rivers and sea is moderate (risk between 0.1% annually or 1 in 1000 years and 1% annually or 1 in 100 years for river flooding, and between 0.1% or 1 in 1000 years and 0.5% annually or 1 in 200 for coastal flooding).
- **Zone C** – Low Probability of Flooding. Where the probability of flooding from rivers and sea is moderate (risk is less than 0.1% annually or 1 in 1000 years for both rivers and coastal flooding).

In accordance with the *Planning Systems and Flood Risk Management Guidelines for Planning Authorities*, dwellings are classified as 'highly vulnerable developments'.

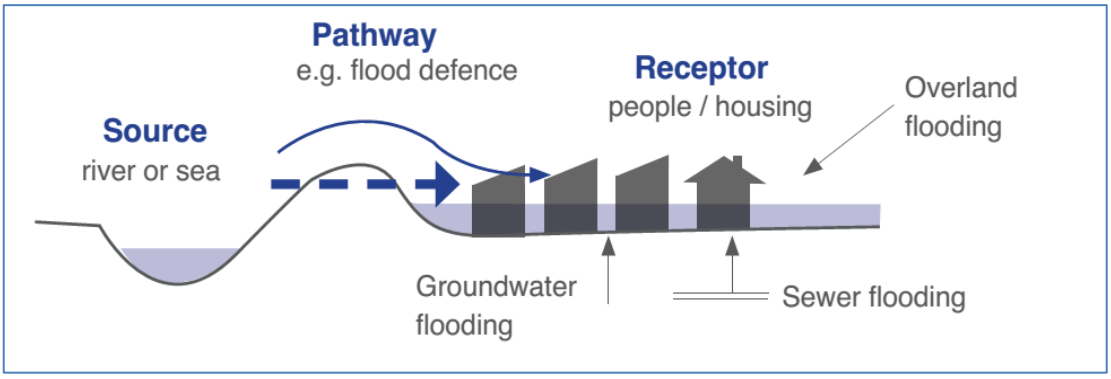

Figure 3 – Source-pathway-receptor model
(*imagery: The Planning System and Flood Risk Management Guidelines*)

The flooding guidelines have developed an 'appropriateness' matrix for various developments and their potential risk factor. The table indicates if further analysis is required in the form of a justification test. Table 3 below outlines the conditions that require a justification test.

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

Table 3 - Flood Zone Vs Justification Test Matrix

Following a review of the South Dublin City Council flood maps, the subject lands are located in **Flood Zone C**. As such a justification test is not required. See **Appendix A** for the SFRA Flood Zone mapping.

5.0 FLOOD RISKS & MITIGATION MEASURES

5.1 Fluvial Flooding

5.1.1 Flood Risk Indicators

The following were interrogated for indicators of fluvial flood risk:

- The Whitestown Stream (Tallaght Stream) is located approx. 1.0km to the south of the subject site. The Dodder Catchment Flood Risk Assessment and Management Study 2010, conducted by RPS Consulting Engineers, indicates that the subject site is deemed to be located outside of the 0.1% AEP fluvial floodplain, and due to the distance between the subject site and closest node point be approx. 1.0km, the subject site is not located on the currently available maps, see **Appendix C**.
- Historical Ordnance Survey OS maps for the subject site do not show any indicators of flood risk.

5.1.2 Results Of Initial Assessment

The available data described above does not provide any indication of fluvial flood risk in the Study Area. Therefore, in accordance with 'Planning System and Flood Risk Management – Guidelines for Planning Authorities (2009)' *a detailed assessment of this flooding mechanism is not required*.

5.2 Tidal Flooding

5.2.1 Flood Risk Indicators

- The OPW maintains the National Flood Hazard Mapping website which contains information about locations that may be at risk from flooding. The source of this information includes Local Authorities and other historic records such as newspaper articles and other documentation about reported floods. There is no evidence of any recorded flood

events at the subject Site (a copy of the summary report is included in **Appendix B**).

- The subject site is not in proximity to the coast which indicates that the subject site is deemed to be located outside the 0.5% AEP tidal floodplain.
- Historical Ordnance Survey OS maps for the subject site do not show any indicators of flood risk.

5.2.2 Results Of Initial Assessment

The available data described above does not indicate the risk of tidal flooding on the development site. Therefore, in accordance with 'Planning System and Flood Risk Management – Guidelines for Planning Authorities (2009)' *a detailed assessment of this flooding mechanism is not required*.

5.3 Pluvial Flooding

5.3.1 Flood Risk Indicators

- The OPW maintains the National Flood Hazard Mapping website which contains information about locations that may be at risk from flooding. The source of this information includes Local Authorities and other historic records such as newspaper articles and other documentation about reported floods. There is no evidence of any recorded flood events at the subject Site (a copy of the summary report is included in **Appendix B**).

Pluvial flooding is flooding which has originated from overland flow resulting from high intensity rain fall. The historical and predicted flooding information does not indicate that the subject lands are at risk from pluvial flood events.

5.4 Surface Water Drainage For The Proposed Development

The proposed surface water strategy and drainage design for the development are outlined within the Engineering Services Report, that accompanies this planning application. In summary, road drainage is collected by gullies and roofs are drained to a proposed attenuation tank located under the car parking. All surface water then discharges into the stormwater sewer (2l/s) located on the link road under the planning application reference number SD178/0007.

Please refer to the CS Consulting Engineering Services Report for more details.

5.5 Results Of Initial Assessment

Based on the above, there is no indication of pluvial flood risk to the subject site. Therefore, in accordance with 'Planning System and Flood Risk Management – Guidelines for Planning Authorities (2009)' *a detailed assessment of this flooding mechanism is not required*.

5.6 Groundwater Flooding

5.6.1 Flood Risk Indicators

According to the Geological Survey of Ireland (GSI) interactive maps, the subject site indicates no karst features are in the area, that groundwater vulnerability is moderate, and the aquifer is Moderately Productive only in Local Zones. The proposed alteration to the existing site will not increase the potential for groundwater flooding as such the risk is deemed acceptable. See **Appendix F** for GSI mapping information for background groundwater & geology data for the subject site.

5.6.2 Results Of Initial Assessment

Based on the above, there is no indication of groundwater flood risk to the subject site. Therefore, in accordance with 'Planning System and Flood Risk Management – Guidelines for Planning Authorities (2009)' *a detailed assessment of this flooding mechanism is not required*.

5.7 Infrastructure Failure

It is the understanding of CS Consulting that the 450mm storm sewer has adequate capacity to take the 2l/sec attenuated storm flow from the subject lands.

6.0 CONCLUSION

6.1.1 Fluvial Flood Risk

There were no indicators of fluvial flood risk associated with the development site and therefore, in accordance with 'Planning System and Flood Risk Management – Guidelines for Planning Authorities (2009)' [the 'FRM Guidelines'] detailed assessment of this flooding mechanism is not required.

6.1.2 Tidal Flood Risk

The available data described above does not indicate the risk of tidal flooding on the development site. Therefore, in accordance with 'Planning System and Flood Risk Management – Guidelines for Planning Authorities (2009)' a detailed assessment of this flooding mechanism is not required.

6.1.3 Pluvial Flood Risk

The pluvial flood-risk indicators described in Section 5.3 do not provide any indication of pluvial flooding at the subject site and therefore, in accordance with 'Planning System and Flood Risk Management – Guidelines for Planning Authorities (2009)' [the 'FRM Guidelines'] detailed assessment of this flooding mechanism is not required.

6.1.4 Flood Risk from Ground Water

Geological Survey of Ireland (GSI) interactive maps do not provide any indication of flood risk from groundwater at the subject site and therefore, in accordance with 'Planning System and Flood Risk Management – Guidelines for Planning Authorities (2009)' [the 'PSFRM Guidelines'] detailed assessment of this flooding mechanism is not required.

7.0 CONCLUSION AND RECOMMENDATIONS

The proposed development was subject to SSFRA in accordance with OPW Flood Risk Management Guidelines. This SSFRA did not find any indicators of the proposed development being at risk from fluvial, pluvial or groundwater flooding; also, the SSFRA did not find any indicators that the proposed development will give rise to flood risk elsewhere.

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Appendix A: South Dublin County Council Flood Zone Mapping

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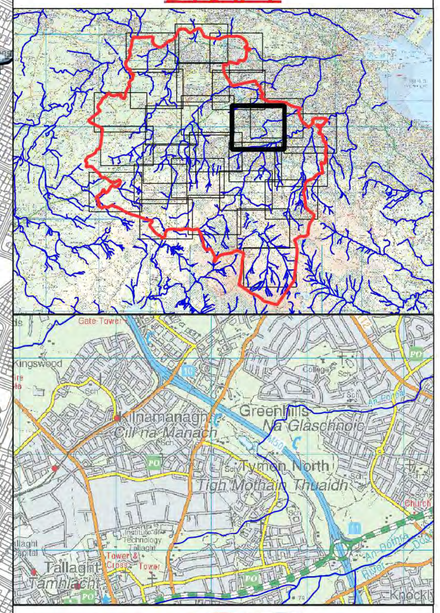
Subject Site

0 200 400 600 800 1000 m

Legend

- Flood Zone A - 1% AEP Flood Extent (1 in 100 chance in any given year)
- Flood Zone B - 1% AEP Flood Extent (1 in 1000 chance in any given year)
- Defended Area
- Watercourse Centreline
- Indicative Flood Extents
- County Boundary

DRAFT



Comhairle Contae Átha Cliath Theas
South Dublin County Council

Project: Strategic Flood Risk Assessment

Title: Fluvial Flood Zone Mapping

Figure: MDW657_0010

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Issue Details

Drawn:	BT	Project No.	MDW0657
Checked:	JH	File Ref	MDW0657QG0010F02
Approved:	JH		
Scale:	1:6000 @ A1	Drawing No.	Projection
Date:	14/01/2016	10 of 26	IG

Notes
1. The viewer of this map should refer to the SFRA Report and Disclaimer

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Appendix B: Office of Public Works Historic Flood Report

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OPW National Flood Hazard Mapping

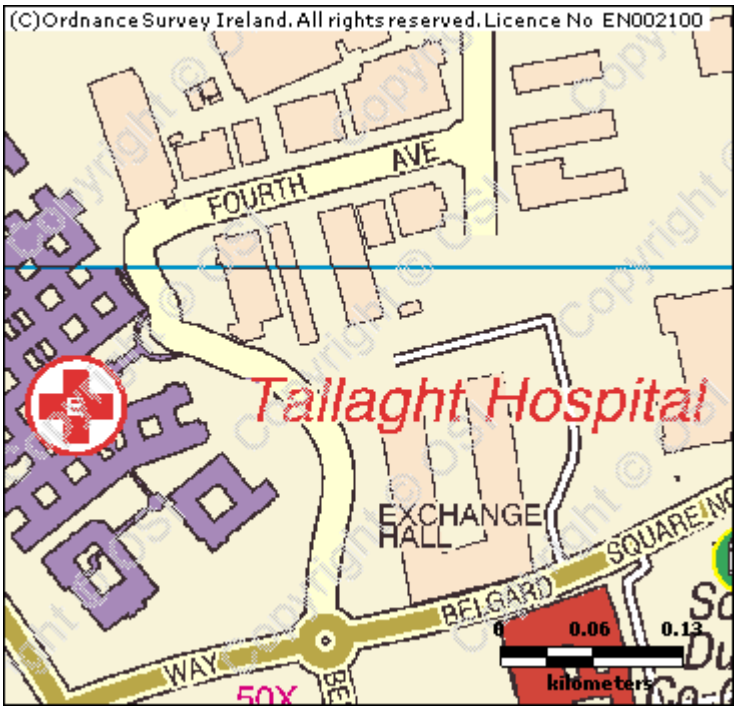
Summary Local Area Report

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

The map centre is in:

County: Dublin

NGR: O 083 279



Map Scale 1:5,229

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.

9 Results

1. Flooding at Knockmore, Tallaght, Co. Dublin on 24th Oct 2011
County: Dublin
Start Date: 24/Oct/2011
Flood Quality Code:3
Additional Information: Reports (1) More Mapped Information

2. Flooding at Tallaght Pass, N81, Dublin 24 on 24th Oct 2011
County: Dublin
Start Date: 24/Oct/2011
Flood Quality Code:2
Additional Information: Reports (1) More Mapped Information

3. Dodder Avonmore Park Nov 2000
County: Dublin
Start Date: 05/Nov/2000
Flood Quality Code:3
Additional Information: Reports (1) More Mapped Information

4. Flooding at Blessington Road, Tallaght, Dublin 24 on 1st May 2012
County: Dublin
Start Date: 05/Jan/2012
Flood Quality Code:2
Additional Information: Reports (1) More Mapped Information

5. Flooding at Bawnlea Crescent and Avenue, Tallaght, Co. Dublin on 24th Oct 2011
County: Dublin
Start Date: 24/Oct/2011
Flood Quality Code:2

Additional Information: Reports (1) More Mapped Information

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6. Flooding at Whitestown Way, Tallaght, Dublin 24 on 24th Oct 2011
County: Dublin
Start Date: 24/Oct/2011
Flood Quality Code:2

Additional Information: Reports (1) More Mapped Information

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7. Dodder Kiltipper Road Nov 2000
County: Dublin
Start Date: 05/Nov/2000
Flood Quality Code:3

Additional Information: Reports (1) More Mapped Information

---

8. Killinarden Stream Jobstown recurring
County: Dublin
Start Date:
Flood Quality Code:4

Additional Information: Reports (1) Press Archive (1) More Mapped Information

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9. Killinarden Stream N81 Jobstown Recurring
County: Dublin
Start Date:
Flood Quality Code:4

Additional Information: Reports (1) Press Archive (1) More Mapped Information

Appendix C: Dodder Catchment Flood Risk Assessment and Management Mapping – Fluvial Flood Extent Map

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Subject Site is located at the north

TS1_3471
TS1_3111
TS1_3165
TS1_3051
TS1_3047
TS1_3010
TS1_3320
TS1_3475
TS1_2790
TS1_2488
TS1_2590
TS1_2320
TS1_2209
TS1_2503
TS1_2092
TS1_2300
TS2_560
TS1_2115
TS1_1820
TS1_1990
TS2_360
TS2_180
TS2_0

10% Flow = 10.68 m^3/s
1% Flow = 18.846 m^3/s
0.1% Flow = 29.867 m^3/s

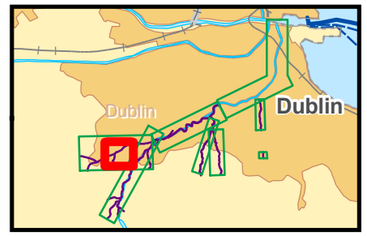
10% Flow = 13.2 m^3/s
1% Flow = 21.758 m^3/s
0.1% Flow = 35.557 m^3/s

10% Flow = 3.57 m^3/s
1% Flow = 5.9 m^3/s
0.1% Flow = 9.34 m^3/s

10% Flow = 3.58 m^3/s
1% Flow = 5.96 m^3/s
0.1% Flow = 9.71 m^3/s

	Water Level (mOD) per AEP		
Node Label	WL 10%	WL 1%	WL 0.1%
TS1-1820	98.38	98.77	99.06
TS1-1990	95.47	96.29	96.60
TS1-2092	95.20	96.09	96.35
TS1-2115	95.08	95.46	95.59
TS1-2209	95.08	95.45	95.60
TS1-2300	94.26	94.59	94.85
TS1-2320	94.23	94.57	94.82
TS1-2488	93.70	94.10	94.33
TS1-2503	93.57	93.83	94.04
TS1-2590	91.94	92.21	92.53
TS1-2790	90.39	90.65	90.98
TS1-3010	89.29	89.89	90.38
TS1-3047	89.22	89.69	90.04
TS1-3051	89.21	89.67	90.01
TS1-3111	89.19	89.65	89.99
TS1-3165	87.71	88.05	88.51
TS1-3320	87.00	87.37	87.98
TS1-3471	86.32	86.69	87.21
TS1-3475	86.27	86.62	87.13
TS2-0	98.14	98.38	98.69
TS2-180	96.75	96.94	97.14
TS2-360	95.13	95.37	95.68
TS2-560	94.33	94.74	95.00

Location Plan:



Legend:

- 10 % AEP Flood Extent (1 in 10 chance in any given year)
- 1 % AEP Flood Extent (1 in 100 chance in any given year)
- 0.1 % AEP Flood Extent (1 in 1000 chance in any given year)
- Defended Area
- High Confidence (<20m) (10% AEP)
- Medium Confidence (<40m) (10% AEP)
- Low Confidence (>40m) (10% and 0.1% AEP)
- High Confidence (<20m) (1% AEP)
- Medium Confidence (<40m) (1% AEP)
- Low Confidence (>40m) (1% AEP)
- River Centreline
- Node Point
- OS_2975 Node Label (refer to table)
- Flow reporting location
- 10% Flow = 1.20 / 1% Flow = 1.56 / 0.1% Flow = 2.17 Peak flow during design flood extent

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 BOUND VOLUME, IT SHOULD NOT BE USED FOR ANY PURPOSE.

Client:

Dublin City Baile Átha Cliath · South Dublin County Council · Dún Laoghaire-Rathdown County Council Comhairle Contae Dhún Laoghaire-Ráth an Dúin · OPW

Project:

DODDER CATCHMENT FLOOD RISK ASSESSMENT AND MANAGEMENT STUDY

Map:

PRESENT DAY TALLAGHT STREAM

Map Type: FLOOD EXTENT
Source: FLUVIAL FLOODING
Map Area: URBAN AREA
Scenario: CURRENT

Drawn By :	A.A.B	Date :	26 November 2010
Checked By :	A.J.	Date :	26 November 2010
Approved By :	A.G.B	Date :	26 November 2010

Figure No. :

TS/EXT/UA/CURS/102

Map Series : Page 2 of 3

Drawing Scale : 1: 5,000 **Plot Scale : 1:1 @ A3**

0 0.1 0.2
Kilometers

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Appendix D: Geological Survey of Ireland – Hydrogeology & Bedrock Geology Maps

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Geological Survey Ireland Public Data

Scale: 1:10,000

Geological Survey Ireland

PSI Licence

0 0.05 0.1 0.2 mi

0 0.1 0.2 0.4 km

Map Centre Coordinates (ITM) 708,353 728,196

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Legend

Structural Symbols 100K ITM 2018

- <all other values>
- 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

Bedrock Outcrops 100 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

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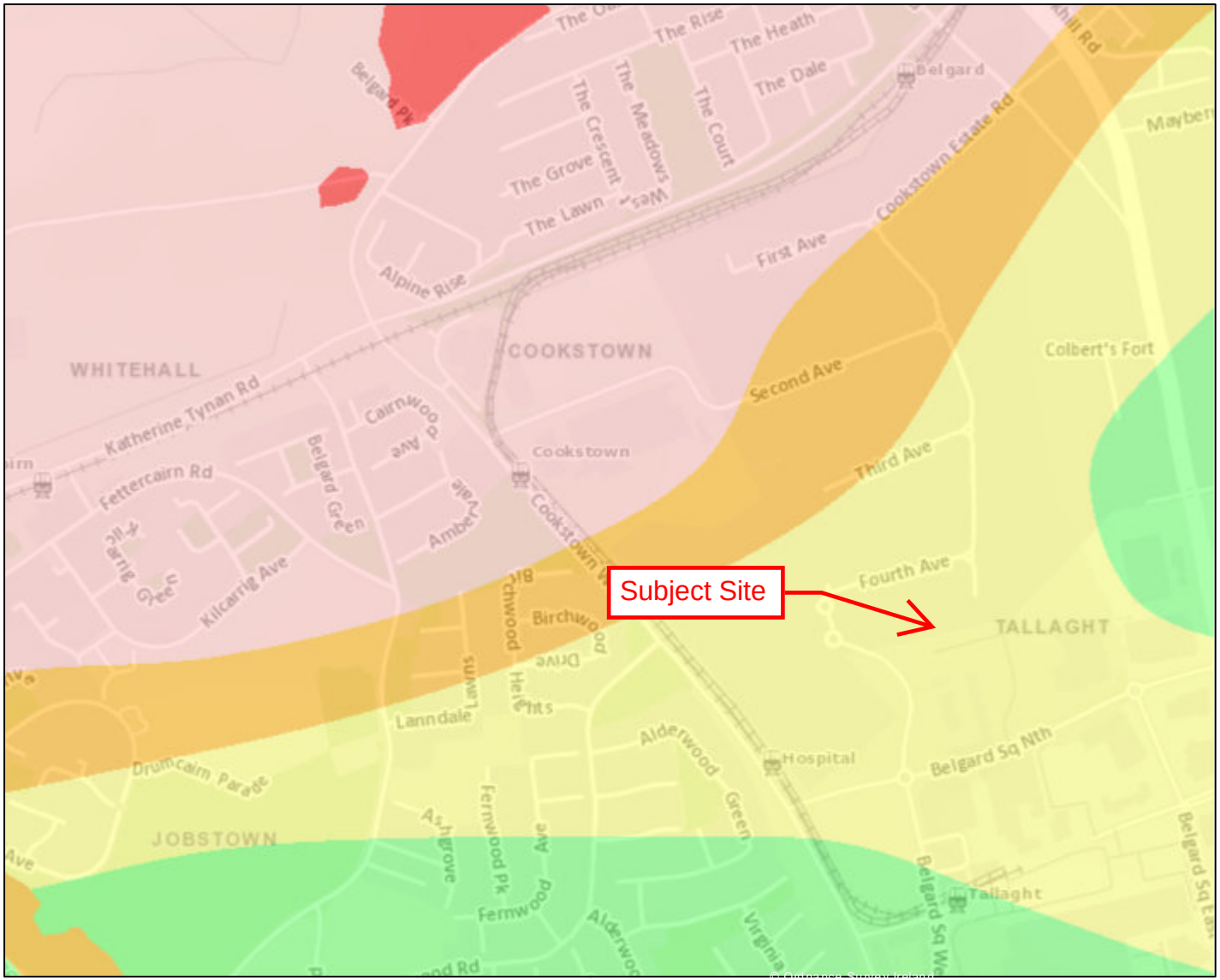
Geological Survey Ireland Public Data



Legend

Karst Landforms

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

- Traced Underground Connections

Gravel Aquifer

- Locally important gravel aquifer
- Regionally important gravel aquifer

National Groundwater Vulnerability Ireland

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

Scale: 1:10,000

Geological Survey Ireland

PSI Licence

0 0.05 0.1 0.2 mi

0 0.1 0.2 0.4 km

Map Centre Coordinates (ITM) 707,841 728,214

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