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Site-Specific Flood Risk Assessment

Proposed Mixed Use Development

Edmondstown, Whitechurch Road, Co. Dublin

Client: BCDK Holdings and Coill Avon Ltd.

Job No. D077

March 2022

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SITE-SPECIFIC FLOOD RISK ASSESSMENT

PROPOSED MIXED USE DEVELOPMENT

EDMONDSTOWN, WHITECHURCH ROAD, CO. DUBLIN

CONTENTS

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BS 1192 FIELD	**EDM-CSC-ZZ-XX-RP-C-0102-P5**

Job Ref.	Author	Reviewed By	Authorised By	Issue Date	Rev. No.
D077	GL	GF	RFM	09.03.2022	P5
D077	GL	GF	RFM	23.02.2022	P4
D077	GL	GF	RFM	22.11.2021	P3
D077	GS	RFM	RFM	05.11.2020	P2
D077	GS	RFM	RFM	18.06.2020	P1

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1.0 INTRODUCTION

Cronin & Sutton Consulting Engineers (CS Consulting) have been commissioned by BCDK Holdings and Coill Avon Ltd to prepare a Site Specific Flood Risk Assessment to accompany a planning application for a mixed use development at Edmondstown, Whitechurch Road, Dublin.

In preparing this report, CS Consulting has referred 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 comprises 2no. land parcels at Kilmashogue House and Coill Avon house, Whitechurch Road, Rathfarnham, Dublin 16. The site has a total area of 6.77ha and is located to the north of the M50 and to the west of Whitechurch Road, in the operational areas of South Dublin County Council (SDCC) and Dún Laoghaire-Rathdown County Council (DLRCC).

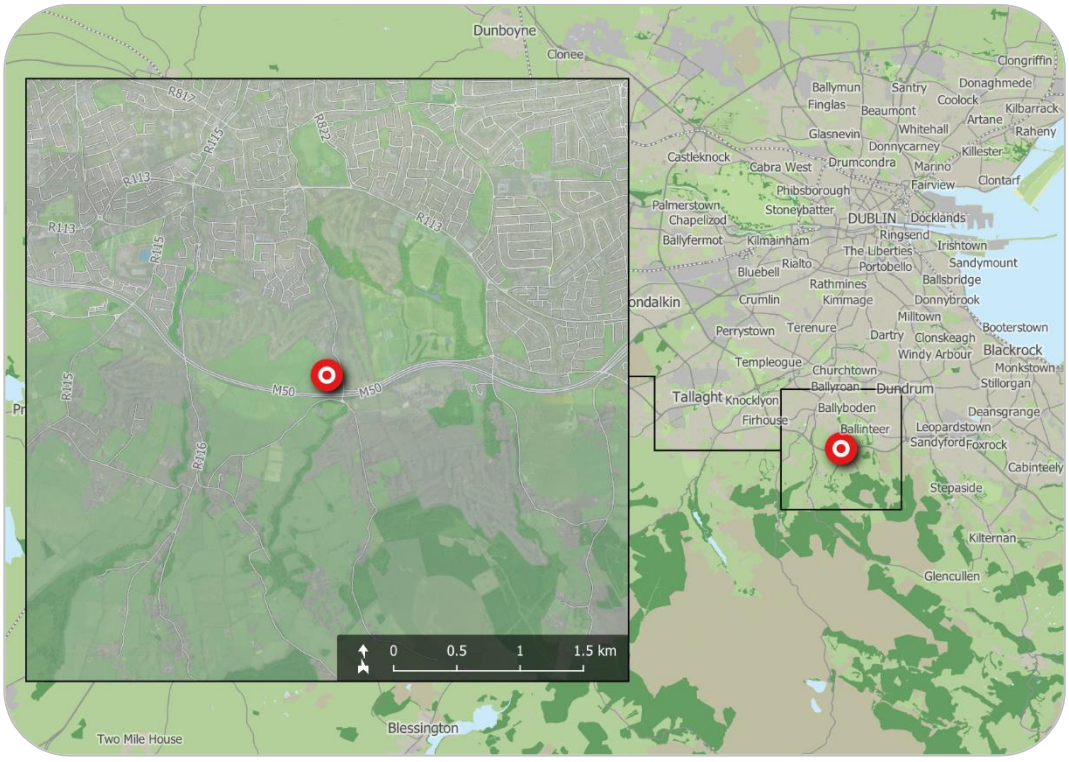


Figure 1 – Location of proposed development site
(map data & imagery: EPA, OSM Contributors, Google)

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 the Edmondstown Golf Club and existing residential units, to the east by Whitechurch Road, and to the south by the M50 motorway.

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

2.2 Existing Land Use

The development site is greenfield in nature and falls from south to north. The Whitechurch Stream is located to the west of Whitechurch Road, flowing south to north through the subject site.

2.3 Proposed Development

The proposed development on a site that extends to 6.77 hectares includes the derelict Kilmashogue House (southern lands) and Coill Avon house (northern lands), adjacent roads in the control of South Dublin County and

Dun Laoghaire Rathdown County Councils and consists of the following developments: -

- Demolition of Kilmashogue House and outbuildings and demolition of Coill Avon house and outbuildings;
- The refurbishment and re-use of 2 no. stone outbuildings for community use, to be incorporated into an area of public open space on the southern lands;
- The construction of a mixed-use development comprising neighbourhood centre and 178 no. residential units comprising 72 no. houses, 38 no. apartments and 68 no. duplex apartments;
- The 72 no. houses will comprise 2, 2.5 and 3-storey detached, semi-detached and terraced units to include:-
    - 6 no. 2-bed houses;
    - 45 no. 3-bed houses;
    - 21 no. 4-bed houses;
- The 38 no. apartments and 68 no. duplex apartments are located across 7 no. buildings ranging in height from 3 to 5-storey consisting of 1 no. Block A/B, 1 no. Block C, 1 no. Block E, 1 no. Block S and 3 no. Blocks T-type as follows: -
    - Block A/B: 5-storey over basement and podium accommodating 10 no. 1-bed apartments, 16 no. 2-bed duplex apartments and 1 no. 3-bed duplex apartment with associated balconies/terraces;

- Block C: 5-storey over basement accommodating 4 no. 1-bed apartments and 8 no. 2-bed duplex apartments with associated balconies/terraces;
- Block E: 4-storey over basement accommodating 8 no. 1-bed apartments and 16 no. 2-bed duplex apartments with associated balconies/terraces;
- Block S: 3-storey accommodating 2 no. 2-bed duplex apartments and 1 no. 3-bed apartment and 1 No. 3-bed duplex apartments with associated balconies/terraces;
- Block T: 3no. 3-storey buildings accommodating 6 no. 1-bed apartments, 18 no. 2-bed duplex apartments, 9 no. 3-bed apartments and 6 no. 3-bed duplex apartments, all with associated balconies/terraces;

- Block A/B and Block C are arranged around a landscaped podium. The neighbourhood centre is located below this podium and accommodates a 2-level creche (313m²) at lower ground and ground floor level, and 3 no. retail/non-retail service/cafe units (470m2) at ground level;
- The basement below Block A/B and Block C accommodates 50 no. car parking spaces, bicycle parking, bin stores, plant and staff service area (80m2);
- The basement below Block E accommodates 35 no. car parking spaces, bicycle parking, bin store and plant;
- A section of link street with footpath and cycle path (approx. 438 linear metres) extending from the junction of Whitechurch Road and College Road on an alignment parallel to the M50, to provide

access to the southern development lands and incorporating a bus turning circle;

- Upgrade works to College Road including a new two-way cycle track and relocated footpath from the Whitechurch Road junction to provide connectivity to the Slang River pedestrian/cycle Greenway;
- A new signalised crossroads junction to connect the proposed link street with Whitechurch Road and College Road;
- Upgrade to the existing vehicular access at the entrance to Coill Avon house on Whitechurch Road;
- Foul sewer drainage works along Whitechurch Road from the Kilmashogue junction to the existing junction at Glinbury housing estate;
- All landscaping, surface car parking, boundary treatments, infrastructure works, ESB substation, and associated site works and services.

3.0 PROCESS FOR SITE-SPECIFIC FLOOD RISK ASSESSMENT

The initial stage of the 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 shall 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.

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 OPW's 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.
- 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 sites have 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'.

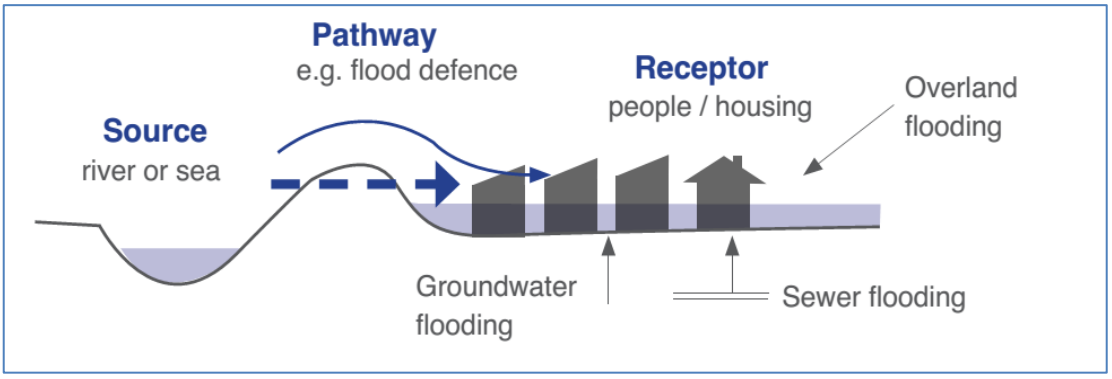


Figure 3 – Source-pathway-receptor model
(*imagery: The Planning System and Flood Risk Management Guidelines*)

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

Reviewing the SDCC flood maps, the subject sites are located in **Flood Zone C**. See **Appendix A**.

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 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 sites (a copy of the summary report is included in **Appendix B**).
- The Whitechurch Stream is located to the west of Whitechurch Road, flowing north to south towards the M50 and it goes through the subject sites (easterner boundary). 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, based on the currently available maps, see **Appendix C**.
- The nearest node point (WS-165) to Northern Parcel indicates a water level of 108.94m AOD for the 1000-year flood level. The proposed levels of the development located in Northern Parcel are in excess of this level and therefore the sites' location is such that it is not affected by fluvial flooding from the Whitechurch Stream.
- The nearest node point (WS-58) to the Southern Parcel indicates a water level of 110.80m AOD for the 1000-year flood level. The proposed levels of the development located in the Southern Parcel are in excess of this

level and therefore the sites' location is such that it is not affected by fluvial flooding from the Whitechurch Stream.

- 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.

5.2.2 Results Of Initial Assessment

The available data described above does not indicate the risk of tidal flooding on the development sites. 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

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.

5.3.1 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 sites (a copy of the summary report is included in **Appendix B**).

5.3.2 Results Of Initial Assessment

The available data described above does not indicate the risk of pluvial flooding on the development sites. 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*. However in accordance with best practice an overland flood route has been designed into the development sites in the rare event of a blockage occurring to the network. Please see Drawing **EDM-CSC-GF-XX-DR-C-0037** by CS Consulting of the Overland Flood Route across the development sites included with this submission.

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 number of proposed attenuation tanks located in different locations, this preventing flooding on the development site up to and including the 100 year storm event. All surface water then discharges into the existing watercourse (Whitechurch Stream) located at eastern boundary of the Northern Parcel and the Southern Parcel. These discharge flows are limited to 5.3 l/s for the Northern Parcel and 4.0 l/s for the Southern Parcel. With these low discharge flows entering the Whitechurch Stream from the development sites it is deemed to be in line with current greenfield runoff rates and shall not increase the risk of flooding downstream of the development sites.

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

5.4.1 Results Of Initial Assessment

Based on the above, there is no indication of pluvial flood risk to the subject sites. 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*.

5.5 Groundwater Flooding

5.5.1 Flood Risk Indicators

The Geological Survey of Irelands database, (www.GSI.ie) provides information in regards to groundwater flooding. From a review of the database in respect to the development sites shows no indication of past

groundwater flooding events. The database clarifies that there is no probability of groundwater flooding occurring in the area. Therefore, the proposed alteration to the existing sites shall not increase the potential for groundwater flooding as such the risk is deemed acceptable for development to occur. See **Appendix D** for GSI mapping information for background groundwater for the subject site.

5.5.2 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*.

6.0 CONCLUSION

6.1.1 Fluvial Flood Risk

There were no indicators of fluvial flood risk associated with the development sites 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 sites. 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 on or downstream of the development sites 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.

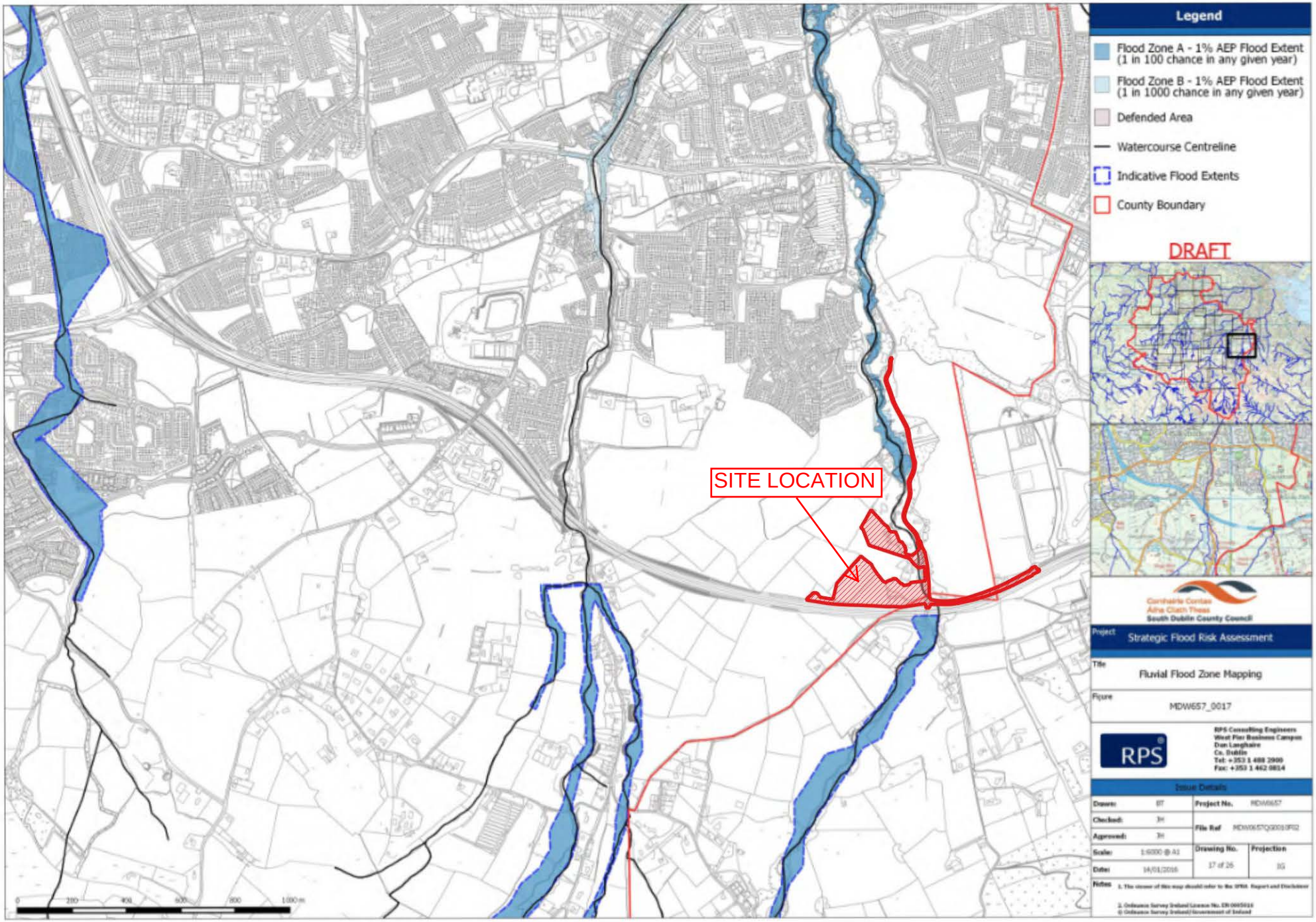
6.1.4 Flood Risk from Ground Water

Geological Survey of Ireland (GSI) interactive maps do not provide any indication of flood risk from groundwater at the subject sites 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.

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 shall give rise to flood risk elsewhere.

Appendix A

South Dublin County Council Flood Zone Mapping


SITE LOCATION
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
South Dublin County Council
Project
Strategic Flood Risk Assessment
Title
Fluvial Flood Zone Mapping
Figure
MDW657_0017
RPS
RPS Consulting Engineers
West Pier Business Campus
Dun Laoghaire
Co. Dublin
Tel: +353 1 488 2900
Fax: +353 1 462 0814
Issue Details
Drawn:
BT
Checked:
JH
Approved:
JH
Scale:
1:6000 @ A1
Date:
14/01/2016
Project No.
MDW657
File Ref
MDW657QI001BF02
Drawing No.
17 of 26
Projection
ITM
Notes
1. The viewer of this map should refer to the SFRA Report and Disclaimer
2. Ordnance Survey Ireland Licence No. EN 0005016
© Ordnance Survey Ireland/Government of Ireland
0
200
400
600
800
1,000 m

Appendix B

Office of Public Works Historic Flood Report

OPW National Flood Hazard Mapping

Summary Local Area Report

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

The map centre is in:

County: Dublin

NGR: O 142 259

Map Scale 1:14,884

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.

10 Results

1. Little Dargle Grange Road Nov 1982
Start Date: 07/Nov/1982
County: Dublin
Flood Quality Code:3
Additional Information: Reports (1) More Mapped Information

2. Grange River Tibradden Lane June 2003
Start Date: 30/Jun/2003
County: Dublin
Flood Quality Code:4
Additional Information: Reports (2) More Mapped Information

3. Grange River Kilmashogue Lane June 2003
Start Date: 30/Jun/2003
County: Dublin
Flood Quality Code:4
Additional Information: Reports (2) More Mapped Information

4. Owenadoher Edmondstown Road. Nov 2000
Start Date: 05/Nov/2000
County: Dublin
Flood Quality Code:3
Additional Information: Reports (2) More Mapped Information

5. Barton Drive Ballyboden Feb 1994
Start Date: 03/Feb/1994
County: Dublin
Flood Quality Code:3

Additional Information: Reports (1) More Mapped Information

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6. Whitechurch Court Feb 1994 — Start Date: 03/Feb/1994
County: Dublin — Flood Quality Code:3

Additional Information: Reports (1) More Mapped Information

---

7. Boden Villas Feb 1994 — Start Date: 03/Feb/1994
County: Dublin — Flood Quality Code:3

Additional Information: Reports (1) More Mapped Information

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8. Ballyboden Road Whitecliff Recurring — Start Date:
County: Dublin — Flood Quality Code:3

Additional Information: Reports (1) More Mapped Information

---

9. Manor Rise Recurring — Start Date:
County: Dublin — Flood Quality Code:4

Additional Information: Reports (2) More Mapped Information

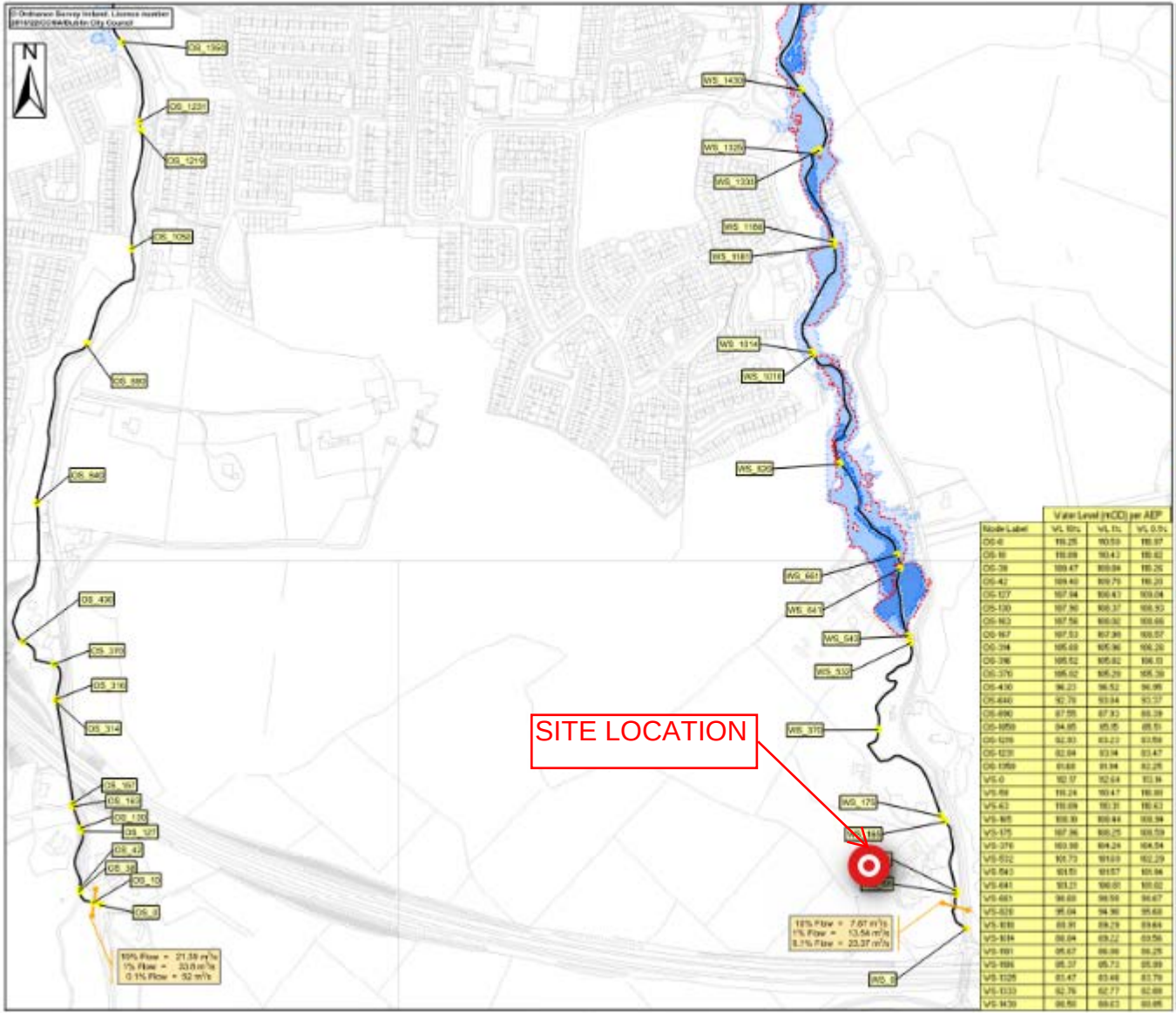
---

10. Grange Stream Tibradden Lane Mutton Lane Recurring — Start Date:
County: Dublin — Flood Quality Code:4

Additional Information: Reports (2) More Mapped Information

Appendix C

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

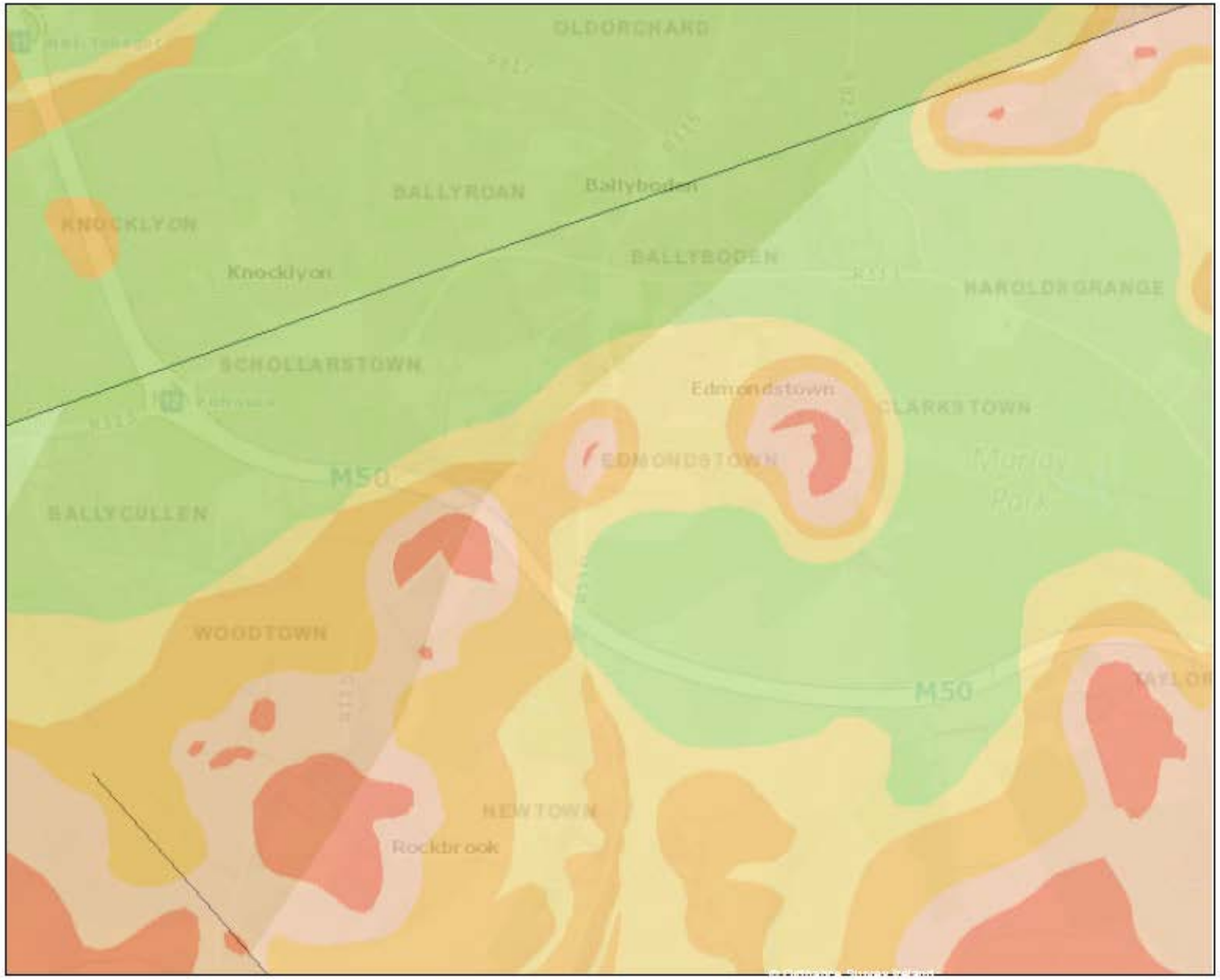


Node Label	Water Level (mOD) per AEP		
	WL 10%	WL 1%	WL 0.1%
OS-46	116.25	116.59	116.97
OS-41	110.09	110.43	110.82
OS-39	109.47	109.84	110.26
OS-42	109.40	109.79	110.20
OS-127	107.94	108.43	109.04
OS-130	107.90	108.37	108.93
OS-163	107.56	108.02	108.65
OS-167	107.53	107.99	108.57
OS-314	105.68	105.96	106.28
OS-316	105.62	105.82	106.10
OS-370	105.62	105.29	105.39
OS-430	96.23	96.52	96.95
OS-440	92.76	93.04	93.37
OS-490	87.55	87.93	88.39
OS-550	84.95	85.05	85.51
OS-629	82.93	83.23	83.69
OS-639	82.64	83.04	83.47
OS-650	81.60	81.94	82.25
WS-0	102.17	102.64	103.16
WS-59	116.24	116.47	116.93
WS-63	110.09	110.31	110.43
WS-165	109.30	109.64	109.94
WS-175	107.96	108.25	108.59
WS-376	103.99	104.24	104.54
WS-532	101.73	101.91	102.29
WS-543	101.51	101.57	101.84
WS-641	101.21	100.91	101.02
WS-661	96.69	96.59	96.67
WS-826	95.04	94.96	95.63
WS-838	93.91	93.79	93.64
WS-934	90.04	89.72	89.56
WS-991	85.67	86.06	86.25
WS-1006	85.37	85.71	85.99
WS-1126	83.47	83.48	83.76
WS-1333	82.76	82.77	82.88
WS-1430	86.50	86.63	86.85

Appendix D

Geological Survey of Ireland – Hydrogeology & Bedrock Geology Maps

Geological Survey Ireland Public Data



Scale: 1:25,000

Geological Survey Ireland

PSI Licence

0 0.175 0.35 0.7 mi

0 0.275 0.55 1.1 km

Map Centre Coordinates (ITM) 713,561 726,246

6/5/2020, 12:40:10 PM

Legend

Public Supply Source Protection Areas

- SI-Inner Protection Area
- SO-Outer Protection Area
- Group Scheme Preliminary Source Protection Areas

Gravel Aquifer

- Locally important gravel aquifer
- Regionally important gravel aquifer

Bedrock Aquifer Faults

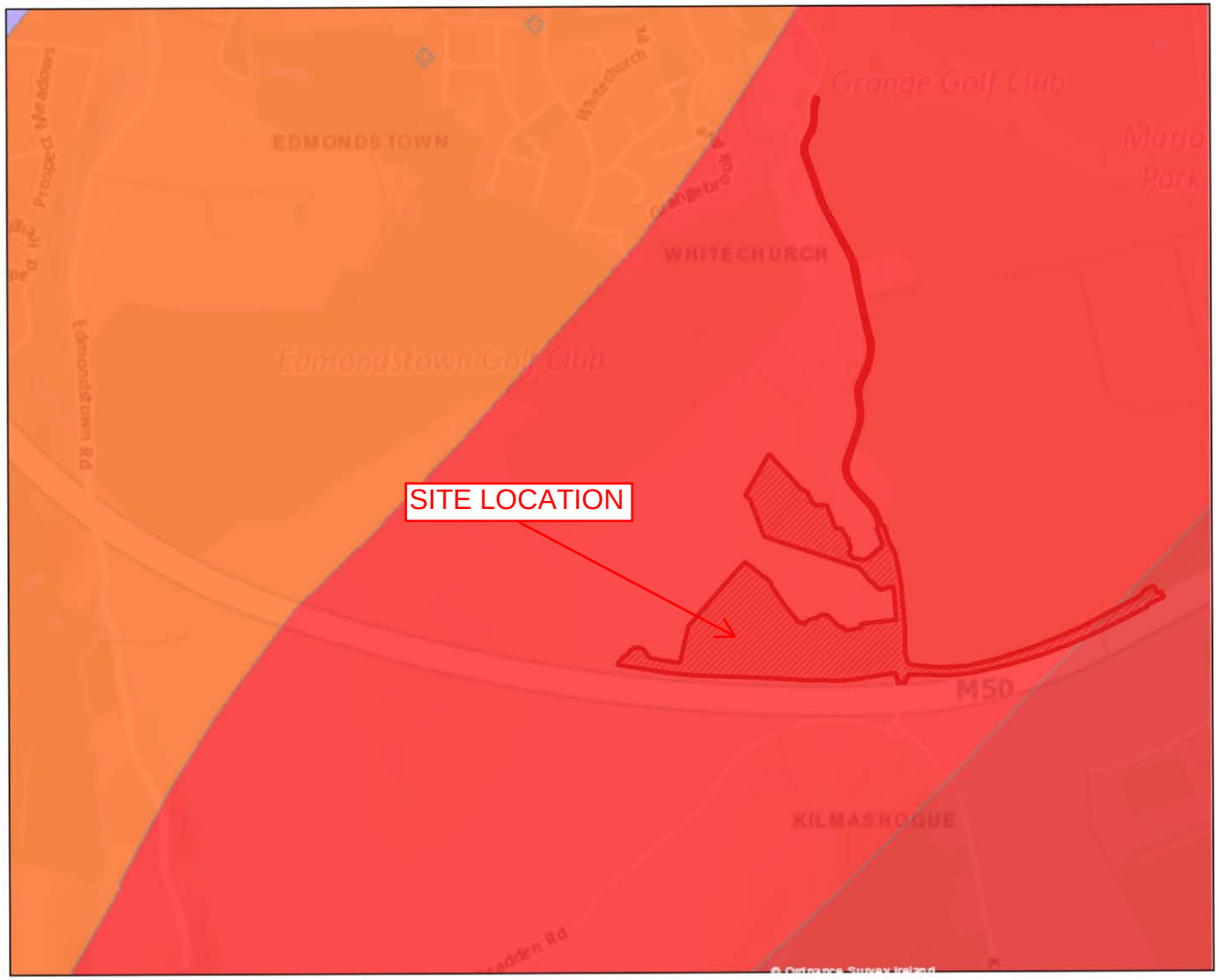
Bedrock Aquifer

- Rkc - Regionally Important Aquifer - Karstified (conduit)
- Rkd - Regionally Important Aquifer - Karstified (diffuse)
- RK - Regionally Important Aquifer - Karstified
- Rf - Regionally Important Aquifer - Fissured bedrock
- Lm - Locally Important Aquifer - Bedrock which is Generally Moderately Productive
- Lk - Locally Important Aquifer - Karstified
- Ll - Locally Important Aquifer - Bedrock which is Moderately Productive only in Local Zones
- Pl - Poor Aquifer - Bedrock which is Generally Unproductive except for Local Zones
- Pu - Poor Aquifer - Bedrock which is Generally Unproductive
- Lake

National Groundwater Vulnerability Ireland

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

Geological Survey Ireland Public Data



Scale: 1:10,000

Geological Survey Ireland

0 0.05 0.1 0.2 mi

0 0.1 0.2 0.4 km

Map Centre Coordinates (ITM) 714,274 725,770

6/5/2020, 11:42:34 AM

PSI Licence

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

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