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Site Specific Flood Risk Assessment

Proposed Residential Development

Mill Road, Saggart, County Dublin

Client: Tetrarch Residential Ltd

Job No. T060

December 2021

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SITE SPECIFIC FLOOD RISK ASSESSMENT

PROPOSED RESIDENTIAL DEVELOPMENT, MILL ROAD, SAGGART, COUNTY DUBLIN

CONTENTS

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File Location:
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1.0 INTRODUCTION

Cronin & Sutton Consulting Engineers (CS Consulting) have been commissioned by Tetrarch Residential Ltd to prepare an Engineering Services Report to accompany a planning application for a residential development at Mill Road, Saggart, County Dublin.

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

- South Dublin 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 Flood Risk Assessment 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, as part of the Planning Submission.

2.0 SITE LOCATION AND PROPOSED DEVELOPMENT

2.1 Site Location

The proposed development site is located on Mill, Saggart, County Dublin. The site is located in the administrative jurisdiction of South Dublin County Council and has a total area of circa 4.95 ha approximately.

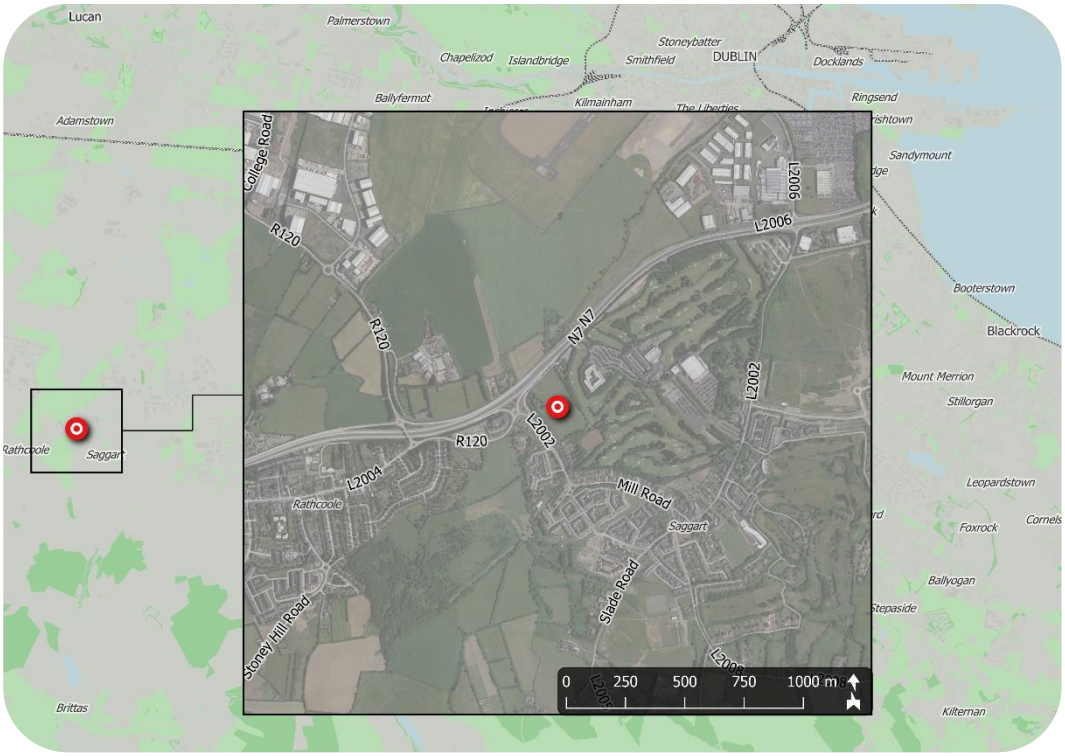

Figure 1 – Site location
(map data: EPA, NTA, OSM Contributors)

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 N7 Naas Road, to the east the Citywest Campus, by a greenfield site and private dwellings to the south, and by Mill Road and private dwellings to the west.

Figure 2 – Elements of surrounding road network
(map data & imagery sources: NTA, OSM Contributors, Google)

2.2 Existing Land Use

The development site is primarily greenfield in nature, falls from north to south towards the River Camac which runs along the site's southwestern boundary, flowing in a north-westerly direction towards the N7. An existing residential building is present on the site which shall be demolished during the course of the works on site.

2.3 Proposed Development

The proposed development comprises of the construction of 274 No. residential units in a mix of 51 houses, 38 duplex units and 185 apartments (For a further breakdown of unit type please refer to the architectural schedule of accommodation). The scheme provides for a main vehicular access via Mill Road at the southwest corner of the development site, to the west and shall also allow for secondary access point from the permitted development to the northwest corner.

3.0 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 summarised in **Table 1.0** below.

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 1.0: 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 City Councils, *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 2.0** below indicates the predicated climate change variations.

Design Category	Predicated Impact of Climate Change
Drainage	20% Increase in rainfall
Fluvial (River flows)	20% Increase in flood flow
Tidal / Coastal	Minimum Finished Floor Level 4.0 – 4.15m AOD

Table 2.0 The predicated climate change variations.

The flooding guidelines categorise 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'.

Reviewing the South Dublin County Council flood maps, the subject site is located in **Flood Zone C**. See **Appendix A**.

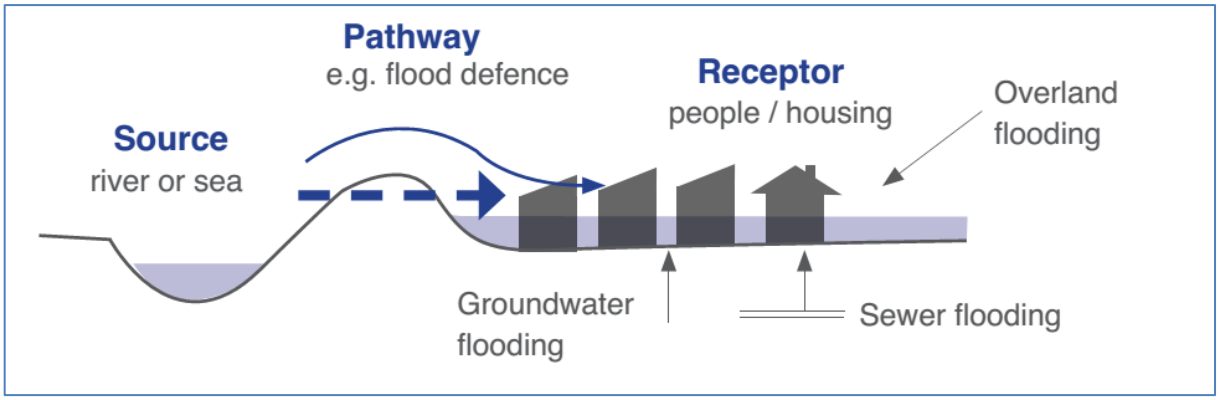

Figure 3 – Source-pathway-receptor model

(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 3.0 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

As noted above the site is located within **Flood Zone C**, as such a justification test is not required.

4.0 FLOOD RISKS & MITIGATION MEASURES

4.1 Fluvial Flooding

As mentioned previously the River Camac which runs along the site's southwestern boundary, flowing in a north-westerly direction towards the N7. A review of the Office of Public Works flood maps database, www.floodmaps.ie, the local area map (see Appendix A) shows flooding to the junction of Mill Road and the Avoca Roundabout and along the N7 Naas Road. No flooding is shown on the applicant site. This is due to the existing topographical levels of the applicant lands being circa 1.0m and rising above the existing levels of Mill Road/Avoca Roundabout and the N7 Naas Road i.e. the areas subject to flooding.

From the floodmap the nearest node point to the applicant site is "09CAMM01552" and the flood level shown for the 0.1% AEP (1000-year event) is 106m AOD. The nearest FFL to this node point and lowest FFL of the scheme is 107.75m AOD, meaning there is ***freeboard of over 1.5m provided to the scheme***.

We note, there is another small local stream running along the eastern boundary with the Citywest Campus. Again, the level of this stream and the existing levels of the applicant site shall prevent the egress of floodwater from this stream onto the applicant site.

Therefore, the risk of fluvial flooding is not an issue and no mitigation measures are required.

4.2 Tidal Flooding

The sites location is such that it is not affected by tidal water bodies and as such tidal flooding is negligible.

4.3 Pluvial Flooding

Pluvial flooding is flooding which has originated from overland flow resulting from high intensity rain fall. From a review of the OPW flood maps there is a record of a flood event due to a high rainfall event in October 2011 at the junction of the Avoca roundabout and Mill Road. See **Appendix B** for OPW Flood Report. The report indicates the event caused the ponding of floodwater to a height of 100mm at the roundabout. No persons were injured or property seriously damaged. As per *Section 4.1*, no flooding is shown on the applicant site. This is due to the existing topographical levels of the applicant lands being circa 1.0m and rising above the existing levels of Mill Road/Avoca Roundabout

4.4 Potential for Site to Contribute to Off-Site Flooding.

The proposed development shall require attenuation to be provided. Attenuation shall be sized for a 1 in 100-year extreme storm event increased for the predicated effects of climate change. The attenuation shall release the storm water in a controlled manner after the peak storm duration has passed. By restricting the flow, the likelihood of the proposed development adversely affecting the public drainage system or contributing to downstream flooding is mitigated. Please refer to Engineering Services Report (under separate cover).

4.5 Existing Off-Site Drainage

It is the understanding of CS Consulting that at present there are no issues with the local drainage arrangements. The subject lands shall only discharge a restricted low flow into the public system thereby reducing the hydraulic pressure on the public network during extreme rainfall events. Notwithstanding this, the development site shall be super-elevated above

to the adjacent lands to prevent the egress of off-site drainage onto the site.

4.6 Groundwater Flooding

According to the Geological Survey of Ireland, GSI, interactive maps (www.gsi.ie/en-ie/data-and-maps/Pages/Groundwater), the subject site is underlain with *Dark Limestone & Shale*. The area is listed as overlaying a locally important aquifer which has bedrock which is *moderately productive only in local zones*. The groundwater vulnerability assessment of the site shows that the vulnerability of groundwater in the area is *high*. There shall be no significant alterations to the existing site levels and no basement structures are proposed and therefore shall not increase the potential for groundwater flooding and as such the risk is deemed acceptable.

5.0 CONCLUSION

- The River Camac which runs along the site's southwestern boundary. A review of the Office of Public Works flood maps database shows flooding to the junction of Mill Road and the Avoca Roundabout and along the N7 Naas Road. No flooding is shown on the applicant site. This is due to the existing topographical levels of the applicant lands being circa 1.0m higher than the surrounding lands.
- The nearest node point on the floodmap for the area to the applicant site is "09CAMM01552". The flood level shown for the 0.1% AEP (1000-year event) is 106m AOD. The nearest FFL to this node point and lowest FFL of the scheme is 107.75m AOD, meaning there is *freeboard of over 1.5m provided to the scheme*.
- Predicted flood mapping for pluvial/tidal flood events shall not affect the subject lands.
- The proposed development shall have a storm water attenuation system to address a 1 in 100-year extreme storm events increased for predicated climate change values. This shall significantly reduce the volume of storm water leaving the site during extreme storms which in turn shall have the effect of reducing the pressure on the existing public drainage system.
- The likelihood of onsite flooding from the hydrogeological ground conditions are deemed to be minor and within acceptable levels.

Appendix A: OPW Flood Maps

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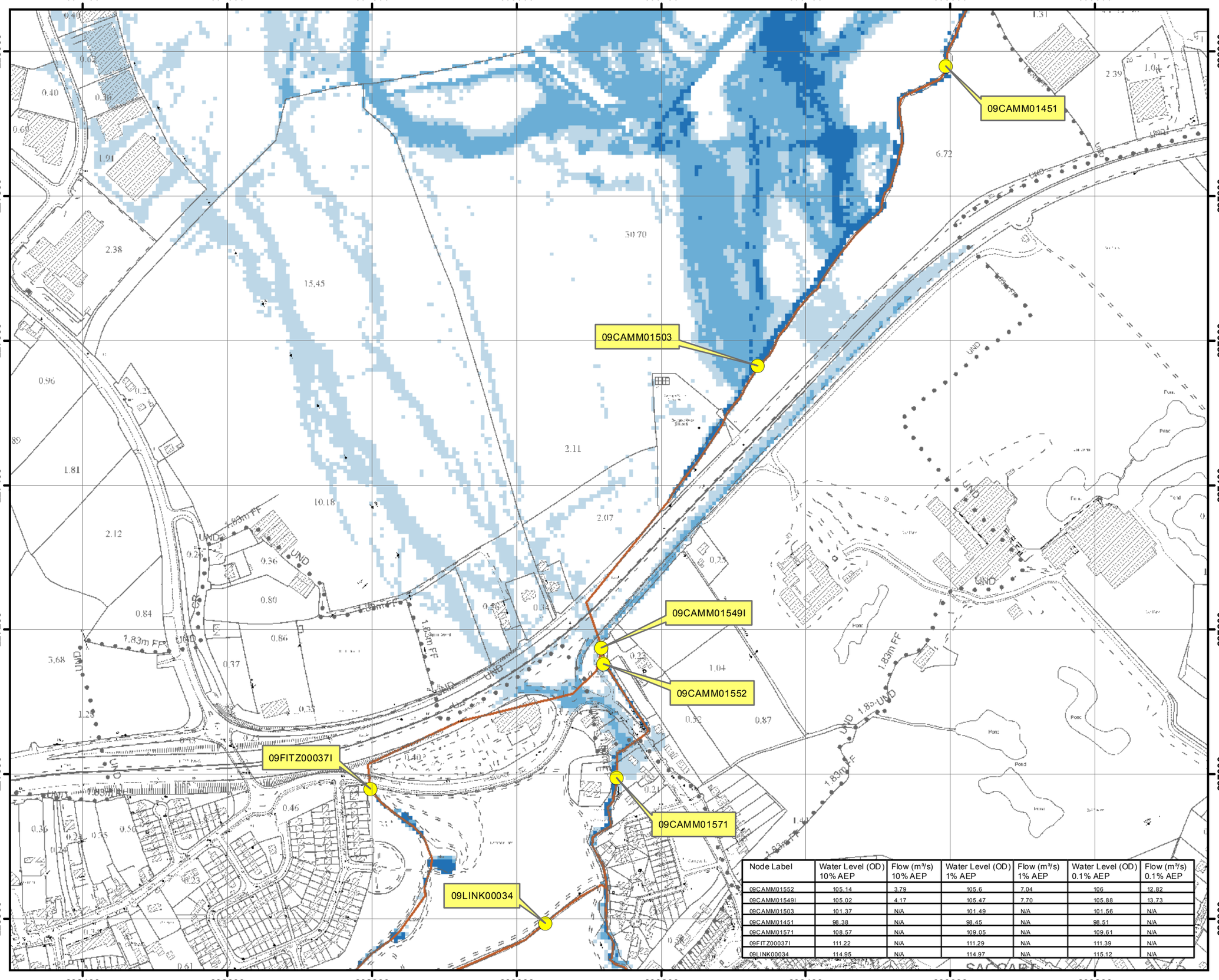

Node Label	Water Level (OD) 10% AEP	Flow (m³/s) 10% AEP	Water Level (OD) 1% AEP	Flow (m³/s) 1% AEP	Water Level (OD) 0.1% AEP	Flow (m³/s) 0.1% AEP
09CAMM01552	105.14	3.79	105.6	7.04	106	12.82
09CAMM01549I	105.02	4.17	105.47	7.70	105.88	13.73
09CAMM01503	101.37	N/A	101.49	N/A	101.56	N/A
09CAMM01451	98.38	N/A	98.45	N/A	98.51	N/A
09CAMM01571	108.57	N/A	109.05	N/A	109.61	N/A
09FITZ00037I	111.22	N/A	111.29	N/A	111.39	N/A
09LINK00034	114.95	N/A	114.97	N/A	115.12	N/A

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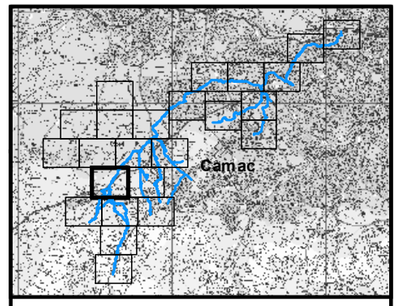

IMPORTANT USER NOTE:
THE VIEWER OF THIS MAP SHOULD REFER TO THE DISCLAIMER, GUIDANCE NOTES AND CONDITIONS OF USE THAT ACCOMPANY THIS MAP.

Legend

- 10% Fluvial AEP Event
- 1% Fluvial AEP Event
- 0.1% Fluvial AEP Event
- Modelled River Centreline
- AFA Extents
- Embankment
- Wall
- Defended Area
- 1% AEP — Standard of Protection of Flood Defence (Walls / Embankments)
- 1% AEP
- Node Point
- Node ID — Node Label

FINAL

REV:	NOTE:	DATE:
01	SOP label updated (Pg 21) Removal of Def. Area (Pg 21)	13/11/2017

EASTERN CFRAM STUDY
CATCHMENT FLOOD RISK ASSESSMENT AND MANAGEMENT

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Map: Camac Fluvial Flood Extents

Map Type:	EXTENT		
Source:	FLUVIAL		
Map Area:	HPW		
Scenario:	CURRENT		
Drawn By :	C.McG.	Date :	13 November 2017
Checked By :	A.S.	Date :	13 November 2017
Approved By :	S.P.	Date :	13 November 2017

Drawing No. : **E09CAM_EXFCD_F1_05**

Map Series : Page 5 of 24

Drawing Scale : 1:5,000 @A3

Appendix B: OPW Historic Flood Maps

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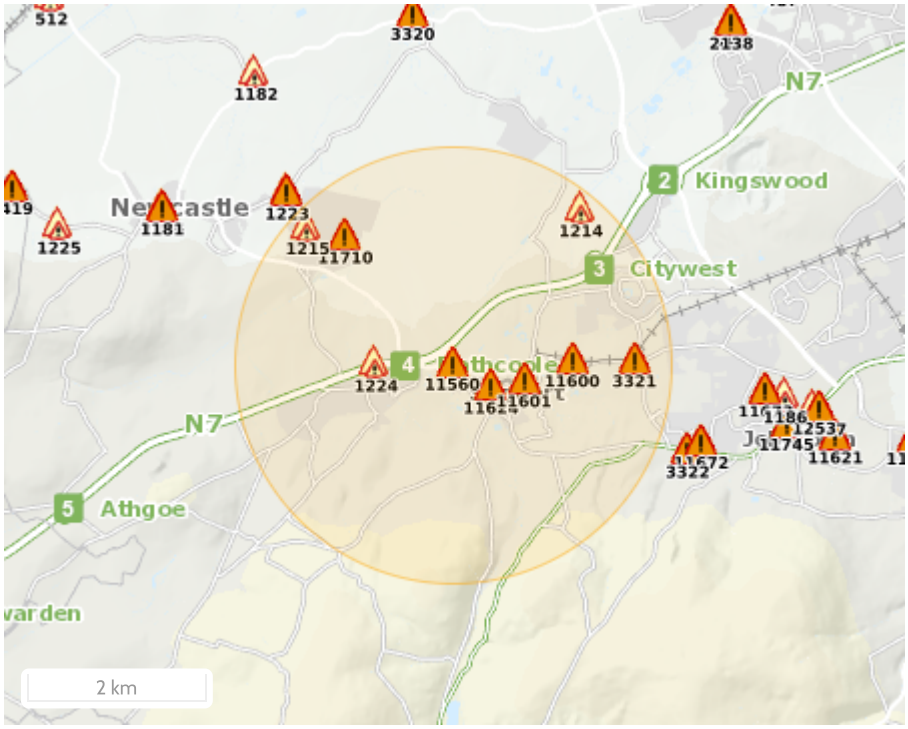
Past Flood Event Local Area Summary Report

Report Produced: **17/12/2020 12:40**

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

This report has been downloaded from www.floodinfo.ie (the "**Website**"). The users should take account of the restrictions and limitations relating to the content and use of the Website that are explained in the Terms and Conditions. It is a condition of use of the Website that you agree to be bound by the disclaimer and other terms and conditions set out on the Website and to the privacy policy on the Website.



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

9 Results

	Name (Flood_ID)	Start Date	Event Location
1.	Baldonnell Barneys Lane Recurring (ID-1214) **Additional Information:** Reports (2) Press Archive (0)	n/a	Approximate Point
2.	Newcastle Greenoge Recurring (ID-1215) **Additional Information:** Reports (2) Press Archive (0)	n/a	Approximate Point
3.	Rathcoole Bridge recurring (ID-1224) **Additional Information:** Reports (2) Press Archive (4)	n/a	Approximate Point
4.	Fortunestown Lane Nov 2000 (ID-3321) **Additional Information:** Reports (1) Press Archive (0)	06/11/2000	Approximate Point
5.	Flooding at Avoca Road, Saggart on 24th Oct 2011 (ID-11560) **Additional Information:** Reports (1) Press Archive (0)	24/10/2011	Exact Point
6.	Flooding at Fortunestown Lane, Citywest, Co. Dublin on 24th Oct 2011 (ID-11600) **Additional Information:** Reports (1) Press Archive (0)	24/10/2011	Approximate Point

	Name (Flood_ID)	Start Date	Event Location
7.	 Flooding at Garter Lane, Saggart, Co. Dublin on 24th Oct 2011 (ID-11601) **Additional Information:** Reports (1) Press Archive (0)	24/10/2011	Approximate Point
8.	 Flooding at Mill Road, Saggart, Co. Dublin on 24th Oct 2011 (ID-11624) **Additional Information:** Reports (1) Press Archive (0)	24/10/2011	Approximate Point
9.	 Flooding at Greenogue Business Park, Rathcoole, Co. Dublin on 24th Oct 2011 (ID-11710) **Additional Information:** Reports (1) Press Archive (0)	24/10/2011	Exact Point

Flooding at Avoca Roundabout, Saggart
24th October 2011

The information contained in this report has been extracted from a Flood Data Collection Form submitted to The Office Of Public Works (OPW) by Consultants working on the Eastern River Basin District (RBD) Catchment Flood Risk Assessment and Management (CFRAM) Project.

- **Location and date of flood event:**

Location: Avoca Roundabout, Saggart, Co. Dublin
Irish Grid Co-ordinates – 303,150 227,050

This flooding event started and ended on 24th October 2011, the peak flood occurred during this time.

- **Source and cause:**

The source of the flood waters was the River Camac. The culvert under Mill Road was overwhelmed due to a blockage in the channel. Water flowed through private property and collected at the Avoca Roundabout.

- **Flood data:**

The following flood information was provided:

Flood Parameter	Max Value	Typical Value	Comments
Flood Level (metres OD Malin)			
Flood Depth (metres)		0.1	Water flowed overland, along N82 and ponded at the Avoca Roundabout.
Flood Flow (m^3/s)			
Flood Velocity (m/s)			

It is not known if flooding previously occurred at this location.

- **Impacts of flooding event:**

Impacts to people: There was no loss of life or serious injury as a result of this flooding event.
Impacts to property:
Residential – 2 properties were affected by this event, but floodwater did not appear to have breached house floor levels.

Impacts to transport infrastructure:
Road – The N82 Mill Road (National Secondary) was affected for 100 metres at the Avoca Roundabout.

- **Documents Attached:**

Photographs and a map of the area are attached.

Avoca Roundabout, Saggart, Co. Dublin

01.jpg

02.jpg

03.jpg

04.jpg

05.jpg

06.jpg

07.jpg

08.jpg

N

105.8

UND

NAAS ROAD

FITZMAURICE ROAD

183m FF

107.7

110.3

LS

Mh

Mhs

H

Legend

- Flow of Water

Flooding Recorded By

- LOCAL COUNCIL
- RPS
- UNCONFIRMED
- River Centreline
- Flood Extent

0 4.5 9 Meters

CLIENT

OPW
The Office of Public Works
Oifig na nOibreacha Poiblí

PROJECT

EASTERN CFRAMS

TITLE

FLOOD EXTENTS
SAGGART, AVOCA ROUNDABOUT

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Drawing No. :

IBE0600_FER_025

Drawn By : BQ
Checked By : AJ
Approved By : MB
Date : 24/01/2012

SCALE : 1:1,000