

REGIONAL ATTENUATION POND 2A, CHERRYWOOD

Site Specific Flood Risk Assessment

Planning- December 2020



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APPENDICES

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1. INTRODUCTION

As part of the preliminary design process, Roughan & O'Donovan Consulting Engineers has carried out a Site Specific Flood Risk Assessment for proposed development of a Regional Attenuation Pond 2A, in Lehaunstown, Cherrywood. This report has been prepared to assess the flood risk to the subject sites and adjacent lands as a result of the proposed development.

1.1 Description of Study Area

Pond 2A will be located within Lehaunstown Development Area 6, Cherrywood, Dún Laoghaire, Co. Dublin. This land is included within the Cherrywood development area which was designated as a Strategic Development Zone (SDZ) in 2010, consisting of approximately 360 ha. A 373m section of a proposed greenway to the south of the pond, which will tie into a proposed greenway (by others) will also be provided as part of this development.

The proposed Regional Attenuation Pond 2A forms part of the Cherrywood SDZ Storm Water Infrastructure as identified in Chapter 4 of the Cherrywood Planning Scheme (CPS) prepared by DLRCC in their role as designated Development Agency for this SDZ. The extents of the Cherrywood SDZ area are shown in Figure 1.1 below. Pond 2A is located within the proposed linear park in Lehaunstown Development Area. The indicative location of this pond as per the CPS is shown in Figure 1.1.

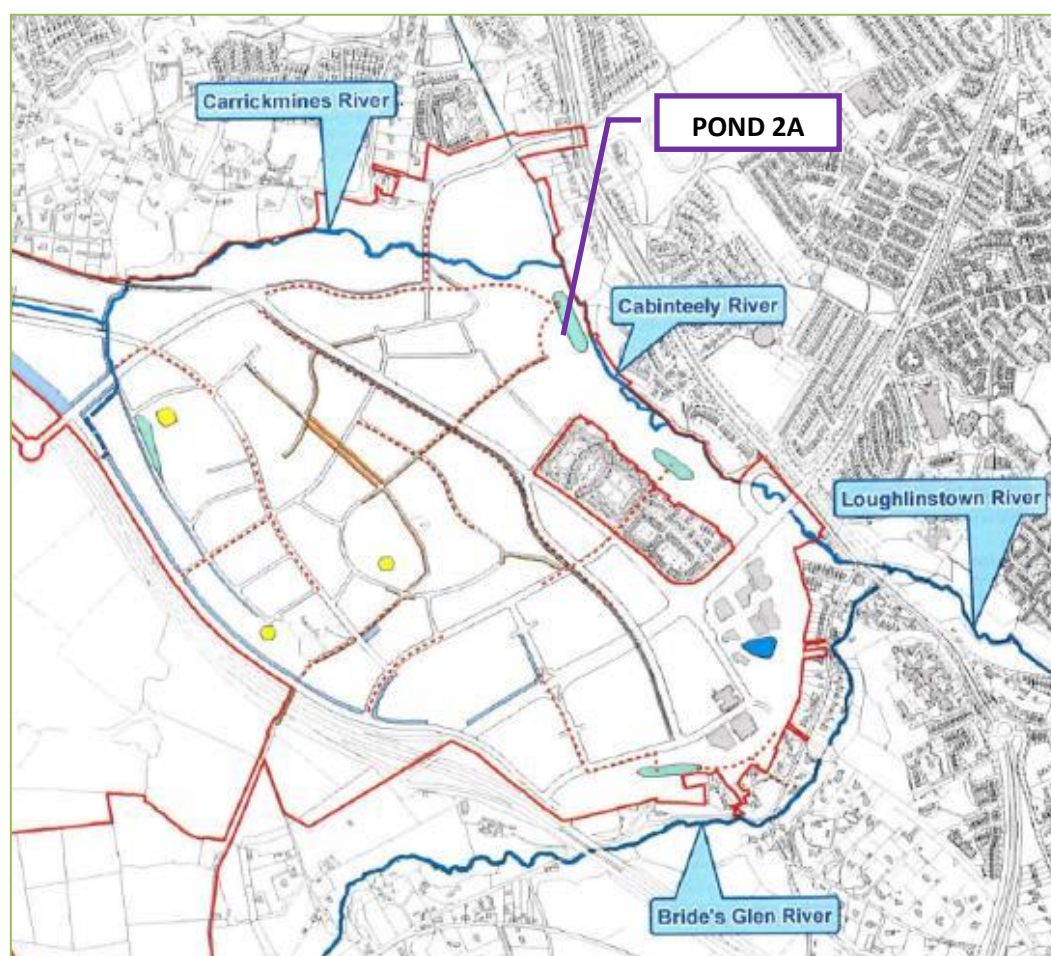


Figure 1.1 Indicative location of Pond 2A within Cherrywood SDZ Site (Extract from Map 4.2 Proposed Storm Water Infrastructure – Cherrywood Planning Scheme)

The site is bounded by the Cabinteely River to the east. The Carrickmines river joins the Cabinteely River further north of the site. The site will be bounded to the west by the proposed development at Residential Development Plot L8 shown in Figure 1.2 below. There is a significant difference in elevation from east to west across the site. The eastern boundary of the site adjacent the Cabinteely river is at ~22mOD while the western boundary of the site is at ~34mOD.

The proposed Pond 2A will be constructed in four tiers. The required attenuation volume will be achieved through the use of a series of flow control structures on each pond. The top tier pond will have an invert level approximately 33mOD and the bottom tier pond will have an invert of approximately 25.70mOD. Refer to Drawing P2ACH-ROD-GEN-SW_AE-DR-CD-3002-3004 for further details.

The proposed development has been designed with regard to flood resilient construction measures and materials. The proposed development will be subject to a maintenance plan, the maintenance of the proposed development will be undertaken by the relevant competent authority.

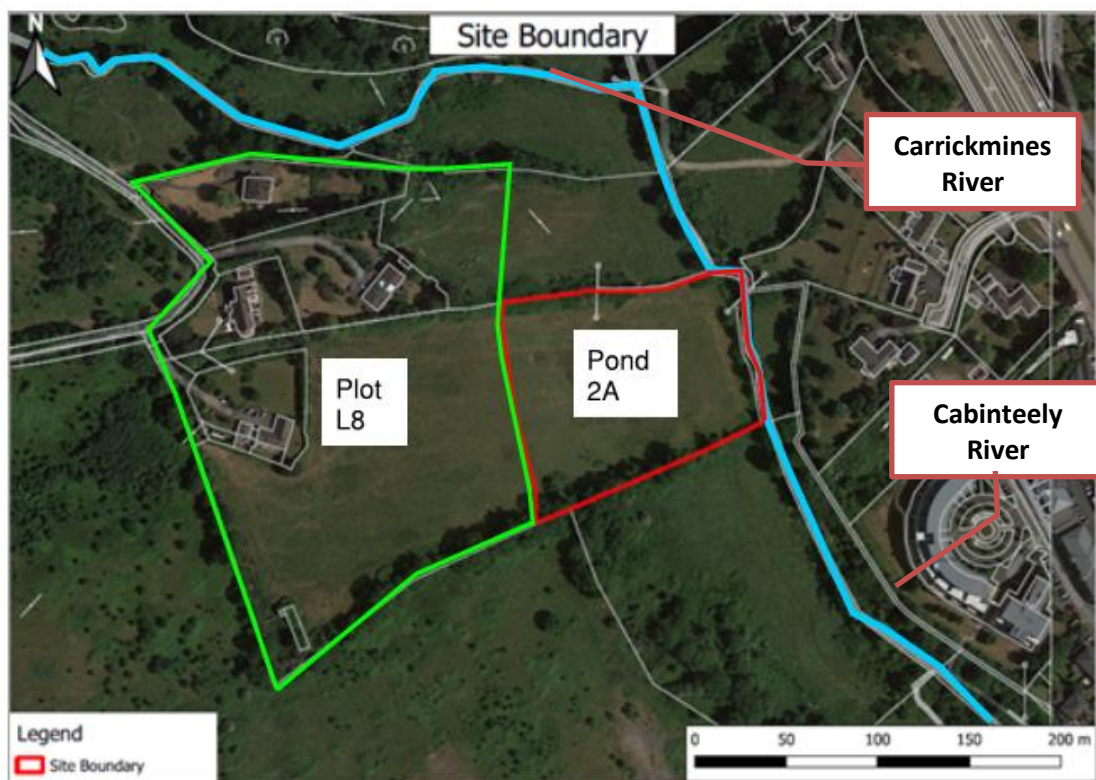


Figure 1.2 Pond 2A Site Location

2. FLOOD RISK

2.1 Introduction

This report has been prepared in accordance with 'The Planning System and Flood Risk Management Guidelines for Planning Authorities' herein referred to as 'The Guidelines' as published by the Office of Public Works (OPW) and Department of Environment, Heritage and Local Government (DoHGL) in 2009.

2.2 Identification of Flood Risk

Flood risk is a combination of the likelihood of a flood event occurring and the potential consequences arising from that flood event and is then normally expressed in terms of the following relationship:

Flood risk = Likelihood of flooding x Consequences of flooding.

To fully assess flood risk 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) is required. Figure 2.1 below shows a source-pathway-receptor model reproduced from 'The Guidelines' (DEHLG-OPW, 2009).

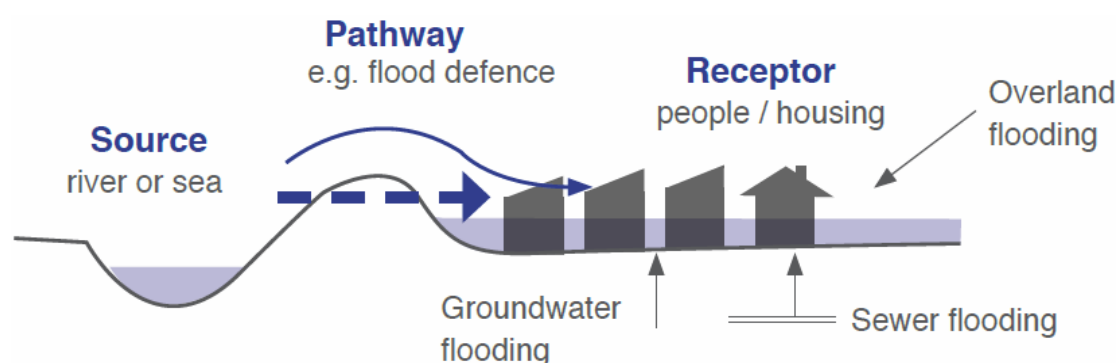


Figure 2.1 Sources, Pathways and Receptors of Flooding

The principal sources of flooding generally are rainfall or higher than normal sea levels. The principal pathways are rivers, drains, sewers, overland flow and river and coastal floodplains. The receptors can include people, their property and the environment. All three elements as well as the vulnerability and exposure of receptors must be examined to determine the potential consequences.

The Guidelines set out a staged approach to the assessment of flood risk with each stage carried out only as needed. The stages are listed below:

- ***Stage I Flood Risk Identification*** – to identify whether there may be any flooding or surface water management issues.
- ***Stage II Initial Flood Risk Assessment*** – to confirm sources of flooding that may affect an area or proposed development, to appraise the adequacy of existing information and to scope the extent of the risk of flooding which may involve preparing indicative flood zone maps.
- ***Stage III Detailed Flood Risk Assessment*** – to assess flood risk issues in sufficient detail and to provide a quantitative appraisal of potential flood risk to a proposed or existing development or land to be zoned, of its potential impact on flood risk elsewhere and of the effectiveness of any proposed mitigation measures.

2.3 Likelihood of Flooding

The Guidelines define the likelihood of flooding as the percentage probability of a flood of a given magnitude or severity occurring or being exceeded in any given year. It is generally expressed as a return period or annual exceedance probability (AEP). A 1% AEP flood indicates a flood event that will be equalled or exceeded on average once every hundred years and has a return period of 1 in 100 years. Annual Exceedance probability is the inverse of return period as shown Table 2.1 below.

Table 2.1 Correlation Between Return Period and AEP

Return Period (years)	Annual Exceedance Probability (%)
1	100
10	10
50	2
100	1
200	0.5
1000	0.1

2.4 Definition of Flood Zones

Flood zones are geographical areas within which the likelihood of flooding is in a particular range. These are split into three categories in The Guidelines:

Flood Zone A

Flood Zone A where the probability of flooding from rivers and the sea is highest (greater than 1% or 1 in 100 for river flooding or 0.5% or 1 in 200 for coastal/tidal flooding);

Flood Zone B

Flood Zone B where the probability of flooding from rivers and the sea is moderate (between 0.1% or 1 in 1000 and 1% or 1 in 100 for river flooding and between 0.1% or 1 in 1000 or 0.5% or 1 in 200 for coastal/tidal flooding);

Flood Zone C

Flood Zone C where the probability of flooding from rivers and the sea is low (less than 0.1% or 1 in 1000 for both river and coastal/tidal flooding. Flood Zone C covers all plan areas which are not in zones A or B.

It is important to note that when determining flood zones the presence of flood protection structures should be ignored. This is because areas protected by flood defences still carry a residual risk from overtopping or breach of defences and the fact that there is no guarantee that the defences will be maintained in perpetuity.

2.5 Sequential Approach & Justification Test

The Guidelines outline the sequential approach that is to be applied to all levels of the planning process. This approach should also be used in the design and layout of a development and the broad philosophy is shown in Figure 2.2 below. In general, development in areas with a high risk of flooding should be avoided as per the sequential approach. However, this is not always possible as many town and city centres are within flood zones and are targeted for development.

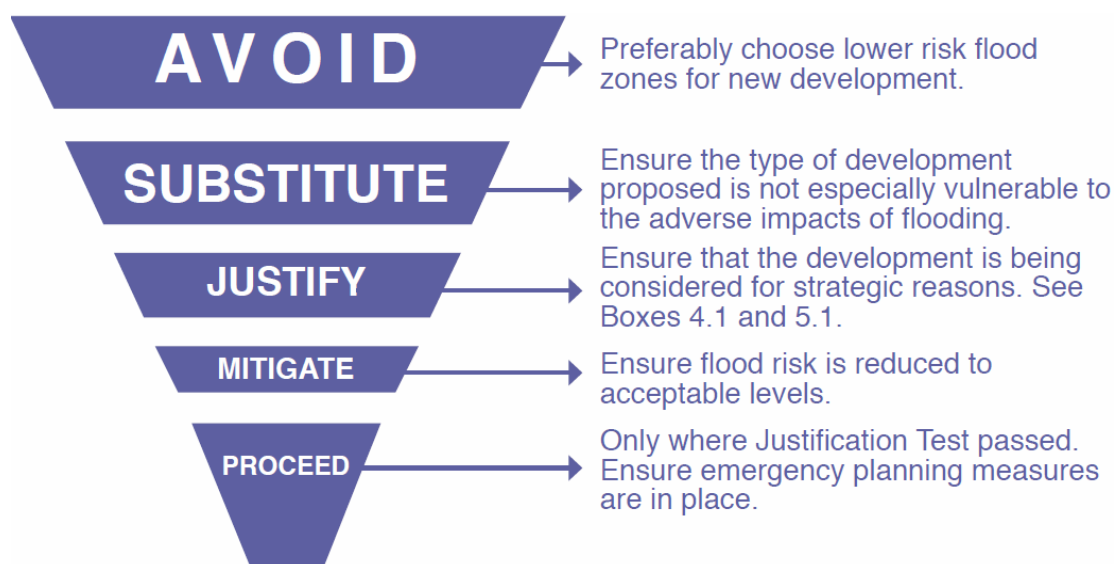


Figure 2.2 Sequential Approach (Source: The Planning System and Flood Risk Management)

The Justification Test has been designed to rigorously assess the appropriateness, or otherwise, of developments that are being considered in areas of moderate or high flood risk. The test comprises the following two processes.

- The first is the Plan-making Justification Test and is used at the plan preparation and adoption stage where it is intended to zone or otherwise designate land which is at moderate or high risk of flooding.
- The second is the Development Management Justification Test and is used at the planning application stage where it is intended to develop land at moderate or high risk of flooding for uses or development vulnerable to flooding that would generally be inappropriate for that land.

Table 2.2 Matrix of Vulnerability Versus Flood Zone to Illustrate Appropriate Development that is Required to Meet the Justification Test (Source: The Planning System and Flood Risk Management)

	Flood Zone A	Flood Zone B	Flood Zone C
Highly vulnerable development (including essential infrastructure)	Justification Test	Justification Test	Appropriate
Less vulnerable development	Justification Test	Appropriate	Appropriate
Water-compatible development	Appropriate	Appropriate	Appropriate

Due to the nature of the scheme and the likely limited impact flooding would have on the development, Pond 2A is considered to be a “Less Vulnerable” development as per the OPW Guidelines.

3. STAGE 1: FLOOD RISK IDENTIFICATION

3.1 General

This Stage 1 Flood Risk Identification includes a review of the existing information and the identification of any flooding or surface water management issues in the study area that may warrant further investigation.

3.2 Information Sources Consulted

The following information sources were consulted as part of the Stage 1 Flood Risk Identification:

Table 3.1 Information Sources Consulted

Source	Data Gathered
Eastern Catchment Flood Risk Assessment and Management Study (CFRAM)	Shanganagh-Carrickmines River Fluvial Flood Extent Mapping.
OPW National Flood Hazard Mapping	www.floodmaps.ie
Irish Coastal Protection Strategy Study (ICPSS) maps consulted	Risks associated with coastal flooding and coastal erosion assessed
Strategic Flood Risk Assessment (SFRA)	County Development Plan 2016-2022 consulted
Geological Survey of Ireland (GSI) Maps	GSI Teagasc subsoils map consulted to identify if alluvial sediments are shown to be present at development site that may indicate the presence of a watercourse and floodplain.
Historical Maps	OSI 25" & 6" mapping assessed
Greater Dublin Strategic Drainage Study (GDSDS)	Drainage studies reports consulted
Benefiting Lands	www.floodmaps.ie

3.3 Primary Sources of Baseline Data

(i) Catchment Flood Risk Assessment and Management Study

The subject site is covered within the Eastern Catchment Flood Risk Assessment and Management (CFRAM) study area. The CFRAM programme led by the OPW, provides a detailed assessment of flooding in areas identified as Areas for Further Assessment (AFA's) during the Preliminary Flood Risk Assessment (PFRA) study. Catchment wide Flood Risk Management Plans were also developed as part of the programme.

The published Final CFRAM (03/11/2017) mapping indicates that a portion of the Pond 2A site is located within the 10% Fluvial AEP flood events. The CFRAM mapping does not indicate any coastal within the site.

The published CFRAM flood maps are reproduced in Appendix B.

(ii) OPW National Flood Hazard Mapping

The OPW National Flood Hazard Mapping Web Site (www.floodmaps.ie) was examined to identify any recorded flood events within the vicinity of the Pond 2A

site. No flood events were recorded for Pond 2A site or its immediate surrounding.

The OPW Flood Hazard Mapping is reproduced in Appendix B.

(iii) Irish Coastal Protection Strategy Study

The Irish Coastal Protection Strategy Study (ICPSS) Phase 2, undertaken by the OPW, covers the South-East coast from Dalkey Island to Carnsore Point Pilot Area and includes the section of coastline nearest to the proposed development study area. The aims of the ICPSS were to establish extreme coastal flood extents, produce coastal flood extent and flood depth maps and assess and quantify the hazard and potential risk associated with coastal erosion.

The ICPSS flood maps indicate that the proposed development is outside the 0.1% (1 in 1,000 year) AEP coastal flood extent.

(iv) Strategic Flood Risk Assessment, Dún Laoghaire – Rathdown County Development Plan 2016 - 2022

The Strategic Flood Risk Assessment (SFRA) has been produced to support the Draft Dún Laoghaire – Rathdown County Development Plan 2016 – 2022 to allow planning decisions to be made on sites at risk of flooding. The Eastern CFRAM draft flood mapping was used in the preparation of the SFRA, therefore, no additional information regarding flooding at Pond 2A site is contained within the SFRA.

(v) Secondary Sources of Baseline data

The following sources were also examined to identify areas that may be liable to flooding:

Table 3.2 Secondary Sources of Baseline Data

Source	Data Gathered
GSI Maps	GSI Teagasc subsoils map shows eastern portion of Pond 2A site is underlain by Alluvium which indicates that this area of the site historically floods. The western part of Pond 2A site is underlain by Limestone till. Refer to Appendix B for GSI maps.
Historical Maps	The eastern portion site has been identified as liable to flooding. Refer to Appendix B for Historical Mapping.
Greater Dublin Strategic Drainage Study (GDSDS)	No recorded drainage issues at Pond 2A site referred to in the GDSDS.
Benefiting Lands	No indication of any benefiting lands within 5 km of the selected flood point (Pond 2A site). Refer to Appendix B for Benefiting Lands (Floodmaps).

3.4 Source – Pathway – Receptor Model

The following source-pathway-receptor model has been developed using the information examined in the Stage I Flood Risk Identification to categorize the sources of flooding, where it flows to (pathway) and the people and infrastructure affected by it (receptors). The likelihood and consequences of each type of flooding have also been

assessed to determine the risk. These are summarised in Table 3.3 (taken from Appendix A of the Guidelines).

Table 3.3 Source-Pathway-Receptor Model

Source	Pathway	Receptor	Likelihood	Consequence	Risk
Fluvial flooding	Overbank flow from the Carrickmines and Cabinteely Rivers	Attenuation Pond / Drainage Infrastructure	<i>High</i>	<i>Medium</i> (Flood resilience integral to design)	<i>Medium</i>
Pluvial flooding	Extreme rainfall events and inadequate surface water drainage	Attenuation Pond / Drainage Infrastructure	<i>High</i> Proposed SW drainage system designed for 1% AEP rainfall event	<i>Low</i> (Flood resilience integral to design)	<i>Low</i>
Coastal flooding	Extreme tides, storm surges or wave overtopping	Attenuation Pond / Drainage Infrastructure	<i>Low</i> Subject site is ~2km from the coast and is >20m above sea level	<i>High</i>	<i>Low</i>
Ground-water Flooding	Rising groundwater levels	Attenuation Pond / Drainage Infrastructure	<i>Low</i> (No reports or geological indicators)	<i>Low</i> (Proposed to raise site levels throughout the site)	<i>Low</i>

3.5 Stage 1 Conclusions

3.5.1 Fluvial Flooding

A number of sources of information including the CFRAM maps, GSI map and historical mapping of the site indicate that a portion of the site is at risk of fluvial flooding. Therefore, a Stage 2 – Initial Fluvial Flood Risk Assessment is required for the development.

3.5.2 Coastal Flooding

Coastal flooding was not identified as a source of flooding affecting the site in any of the sources of information consulted. The site is > 20m above sea level. Therefore, the risk of coastal flooding at the site is classified as low and further assessment is not required.

3.5.3 Pluvial Flooding

Pluvial flooding was not identified as a source of flooding affecting the site in the sources consulted. Therefore, the risk of pluvial flooding is classified as low and no further assessment is required.

3.5.4 Groundwater Flooding

Groundwater flooding was not identified as a source of flooding affecting the site in sources consulted. Therefore, the risk of pluvial flooding is classified as low and no further assessment is required.

4. STAGE 2 – INITIAL FLOOD RISK ASSESSMENT

4.1 General

The Stage 2 Initial Flood Risk Assessment will confirm the of sources of flooding that may affect the proposed development site, appraise the adequacy of existing information and scope the requirements of the Stage 3 Detailed Flood Risk Assessment.

4.2 Sources of Flooding

Fluvial Flood Risk

The OPW Eastern CFRAM Study mapping indicates that the eastern portion of the site floods in the 10% (1 in 10 year) AEP fluvial flood event. The flood mapping also indicates that there is little variation between the 10%, 1% & 0.1% AEP flood events. This is likely due to the significant change in slope across the site which creates a well-defined floodplain. This is supported by the GSI records of alluvial deposits which coincide with the OPW predicted flood extents. Historical map also identifies the same area as liable to flooding.

The location of the pond within the subject site is not within the fluvial flood extents as depicted in the CFRAMs mapping, though it is in close proximity. As such, the Pond 2A site is considered to require a stage 3 detailed flood risk assessment with respect to flooding derived from Fluvial Flooding.

Surface Water Flooding

Surface water flooding occurs when the local drainage system cannot convey stormwater flows from extreme rainfall events. The rainwater does not drain away through the normal drainage pathways or infiltrate into the ground but instead ponds on or flows over the ground instead. Surface water flooding is unpredictable as it depends on a number of factors including ground levels, rainfall and the local drainage network. The drainage network for any development on the site will incorporate Sustainable Drainage Systems (SuDS) for the purpose for managing surface water in terms of both flow and quality. The Pond 2A site is not considered to require a detailed flood risk assessment with respect to surface water flooding.

Groundwater Flooding

Ground water flooding is a result of upwelling in occurrences where the water table or confined aquifers rises above the ground surface. This tends to occur after long periods of sustained rainfall and/or very high tides. High volumes of rainfall and subsequent infiltration to ground will result in a rising of the water table. Groundwater flooding tends to occur in low-lying areas, where with additional groundwater flowing towards these areas, the water table can rise to the surface causing groundwater flooding. The sources consulted such as the Floodmaps.ie and GSI records show no indication that Pond 2A Site is subject to Groundwater derived flooding. The Pond 2A site is not considered to require a detailed flood risk assessment with respect to groundwater flooding.

Pluvial Flood Risk

Pluvial flooding results from heavy rainfall that exceeds ground infiltration capacity or more commonly in Ireland where the ground is already saturated from previous rainfall events. This causes ponding and flooding at localised depressions. Pluvial flooding is commonly a result of changes to the natural flow regime such as the implementation of hard surfacing and improper drainage design. The sources consulted such as the

CFRAM mapping and Floodmaps.ie show no indication that Pond 2A Site is subject to pluvial derived flooding. Pluvial flooding will be considered in the design of drainage systems as part of proposed development.

4.3 Conclusion of Stage 2 SSFRA

The available sources consulted above indicate that a portion of the subject site may be liable to flood in extreme fluvial flood events. As per the OPW Guidelines, a Stage 3 detailed flood risk assessment is required to be undertaken to confirm flood risk (water levels and flood extents) to the proposed development and determine potential flood mitigation measures.

5. STAGE 3 DETAILED FLOOD RISK ASSESSMENT

5.1 Introduction

Stages 1 and 2 of the flood risk assessment for the Pond 2A site have indicated that the lands are subject to flooding in extreme fluvial flood events. This section outlines the assessment undertaken to determine flood levels for the subject site.

5.2 Flood Level estimation

A summary of the CFRAM model output peak flow and water levels for each return period is reproduced in Table 5.1. Node 1060M00322 is located immediately upstream at Carrickmines River approximately 200m northwest of the site whilst node 1060M00276 is located downstream at Cabinteely River approximately 200m southeast of the site.

Table 5.1 CFRAM Model Outputs

Node Label	Water Level (OD) 1% AEP	Flow (m ³ /s) 1% AEP	Water Level (OD) 0.1% AEP	Flow (m ³ /s) 0.1% AEP
1060M00322	25.97	29.85	26.13	48.23
1060M00276	21.87	31.84	22.07	51.55

Using this data ROD extrapolated specific flood levels for the subject site. These are shown in Table 5.2 below.

Table 5.2 Estimated Flood Levels

Location	Q100 WL	Q1000 WL	Q100 + MRFS*	Q1000 + MRFS*
	mOD	mOD	mOD	mOD
Water Level at Upstream Site Boundary	23.83	24.02	23.89	24.07
Water Level at Downstream Site Boundary	22.98	23.17	23.04	23.23

*MRFS refers to the mid range future scenario
The flood level estimation exercise assumes channel is uniform slope between CFRAM nodes.

5.3 Stage 3 Summary

The flood level estimation exercise indicates that the maximum flood level on site in the 1 in 1000 year fluvial flood event (plus climate change factor) is 24.07mOD. The pond outlet (lowest point proposed on scheme) will have a minimum invert level of 24.15mOD. The proposed pond is therefore outside the 1 in 1000 year flood extent and is located in Flood Zone C as per the OPW Guidelines. It should also be noted there is a freeboard of 1.63m above the 1 in 1000 year flood level (plus climate change) to the minimum pond invert level.

6. CONCLUSIONS

This SSFRA has considered the local hydrological conditions pertaining to the Pond 2A subject site and found that the site is subject to fluvial flooding in extreme events. The findings of this SSFRA indicate that the proposed pond is outside the 1 in 1000 year flood extent and is located in Flood Zone C as per The Guidelines. The proposed development will not impact the flood regime of the Cabinteely/Carrickmines river in the 1 in 1000 year flood event or less. The proposed development is therefore appropriate for the subject site with regard to flood risk.

APPENDIX A

GLOSSARY OF TERMS

GLOSSARY OF TERMS

Catchment: The area that is drained by a river or artificial drainage system.

Catchment Flood Risk Assessment and Management Studies (CFRAMS): A catchment-based study involving an assessment of the risk of flooding in a catchment and the development of a strategy for managing that risk in order to reduce adverse effects on people, property and the environment. CFRAMS precede the preparation of Flood Risk Management Plans (see entry for FRMP).

Climate change: Long-term variations in global temperature and weather patterns, which occur both naturally and as a result of human activity, primarily through greenhouse gas emissions.

Core of an urban settlement: The core area of a city, town or village which acts as a centre for a broad range of employment, retail, community, residential and transport functions.

Detailed flood risk assessment: A methodology to assess flood risk issues in sufficient detail and to provide a quantitative appraisal of flood hazard and potential risk to an existing or proposed development, of its potential impact on flood elsewhere and of the effectiveness of any proposed measures.

Estuarial (or tidal) flooding: Flooding from an estuary, where water level may be influenced by both river flows and tidal conditions, with the latter usually being dominant.

Flooding (or inundation): Flooding is the overflowing of water onto land that is normally dry. It may be caused by overtopping or breach of banks or defences, inadequate or slow drainage of rainfall, underlying groundwater levels or blocked drains and sewers. It presents a risk only when people, human assets and ecosystems are present in the areas that flood.

Flood Relief Schemes (FRS): A scheme designed to reduce the risk of flooding at a specific location.

Flood Defence: A man-made structure (e.g. embankment, bund, sluice gate, reservoir or barrier) designed to prevent flooding of areas adjacent to the defence.

Flood Risk Assessment (FRA): FRA can be undertaken at any scale from the national down to the individual site and comprises 3 stages: Flood risk identification, initial flood risk assessment and detailed flood risk assessment.

Flood Risk Identification: A desk-based study to identify whether there may be any flooding or surface water management issues related to a plan area or proposed development site that may warrant further investigation.

Flood Hazard: The features of flooding which have harmful impacts on people, property or the environment (such as the depth of water, speed of flow, rate of onset, duration, water quality, etc.).

Floodplain: A flood plain is any low-lying area of land next to a river or stream, which is susceptible to partial or complete inundation by water during a flood event.

Flood Risk: An expression of the combination of the flood probability, or likelihood and the magnitude of the potential consequences of the flood event.

Flood Storage: The temporary storage of excess run-off, or river flow in ponds, basins, reservoirs or on the flood plain.

Flood Zones: A geographic area for which the probability of flooding from rivers, estuaries or the sea is within a particular range.

Fluvial flooding: Flooding from a river or other watercourse.

Groundwater flooding: Flooding caused by groundwater escaping from the ground when the water table rises to or above ground level.

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

Freeboard: Factor of safety applied for water surfaces. Defines the distance between normal water level and the top of a structure, such as a dam, that impounds or restrains water.

Justification Test: An assessment of whether a development proposal within an area at risk of flooding meets specific criteria for proper planning and sustainable development and demonstrates that it will not be subject to unacceptable risk nor increase flood risk elsewhere. The justification test should be applied only where development is within flood risk areas that would be defined as inappropriate under the screening test of the sequential risk-based approach adopted by this guidance.

Likelihood (probability) of flooding: A general concept relating to the chance of an event occurring. Likelihood is generally expressed as a probability or a frequency of a flood of a given magnitude or severity occurring or being exceeded in any given year. It is based on the average frequency estimated, measured or extrapolated from records over a large number of years and is usually expressed as the chance of a particular flood level being exceeded in any one year. For example, a 1-in-100 or 1% flood is that which would, on average, be expected to occur once in 100 years, though it could happen at any time.

Ordnance Datum (or OD) Malin: is a vertical datum used by an ordnance survey as the basis for deriving altitudes on maps. A spot height may be expressed as AOD for "above ordnance datum". Usually mean sea level (MSL) is used for the datum. In the Republic of Ireland, OD for the Ordnance Survey of Ireland is Malin Ordnance Datum: the MSL at Portmoor Pier, Malin Head, County Donegal, between 1960 and 1969. Prior to 1970, Poolbeg Ordnance Datum was used: the low water of spring tide at Poolbeg lighthouse, Dublin, on 8 April 1837. Poolbeg OD was about 2.7 metres lower than Malin OD.

Management Train/Treatment Train: the sequence of drainage components that collect, convey, store and treat runoff as it drains through the site.

Mitigation: The term is used to describe an action that helps to lessen the impacts of a process or development on the receiving environment. It is used most often in association with measures that would seek to reduce negative impacts of a process or development.

Pathways: These provide the connection between a particular source (e.g. high river or tide level) and the receptor that may be harmed (e.g. property). In flood risk management, pathways are often 'blocked' by barriers, such as flood defence structures, or otherwise modified to reduce the incidence of flooding.

Pluvial flooding: Usually associated with convective summer thunderstorms or high intensity rainfall cells within longer duration events, pluvial flooding is a result of rainfall-generated overland flows which arise before run-off enters any watercourse or sewer. The intensity of rainfall can be such that the run-off totally overwhelms surface water and underground drainage systems.

Regional Planning Guidelines (RPG): These provide the regional context and priorities for applying national planning strategy to each NUTS III region and encourage greater co-ordination of planning policies at the city/county level. RPGs are an important part of the flood policy hierarchy as they can assist in co-ordinating flood risk management policies at the regional level.

Resilience: Sometimes known as “wet-proofing”, resilience relates to how a building is constructed in such a way that, although flood water may enter the building, its impact is minimised, structural integrity is maintained, and repair, drying and cleaning and subsequent reoccupation are facilitated.

Receptors: Things that may be harmed by flooding (e.g. people, houses, buildings or the environment).

Residual risk: The risk which remains after all risk avoidance, substitution and mitigation measures have been implemented, on the basis that such measures can only reduce risk, not eliminate it.

Sequential Approach: The sequential approach is a risk-based method to guide development away from areas that have been identified through a flood risk assessment as being at risk from flooding. Sequential approaches are already established and working effectively in the plan-making and development management processes.

Sustainable Drainage System (SuDS): Drainage systems that are considered to be environmentally beneficial, causing minimal or no long-term detrimental impact.

Site-specific Flood Risk Assessment: An examination of the risks from all sources of flooding of the risks to and potentially arising from development on a specific site, including an examination of the effectiveness and impacts of any control or mitigation measures to be incorporated in that development.

Source: Refers to a source of hazard (e.g. the sea, heavy rainfall).

Strategic Flood Risk Assessment: The assessment of flood risk on a wide geographical area against which to assess development proposed in an area (Region, County, Town).

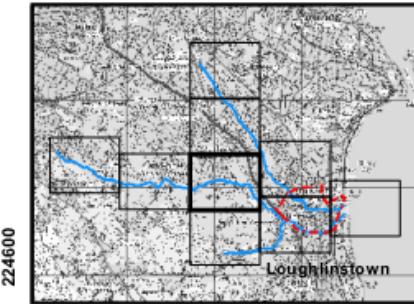
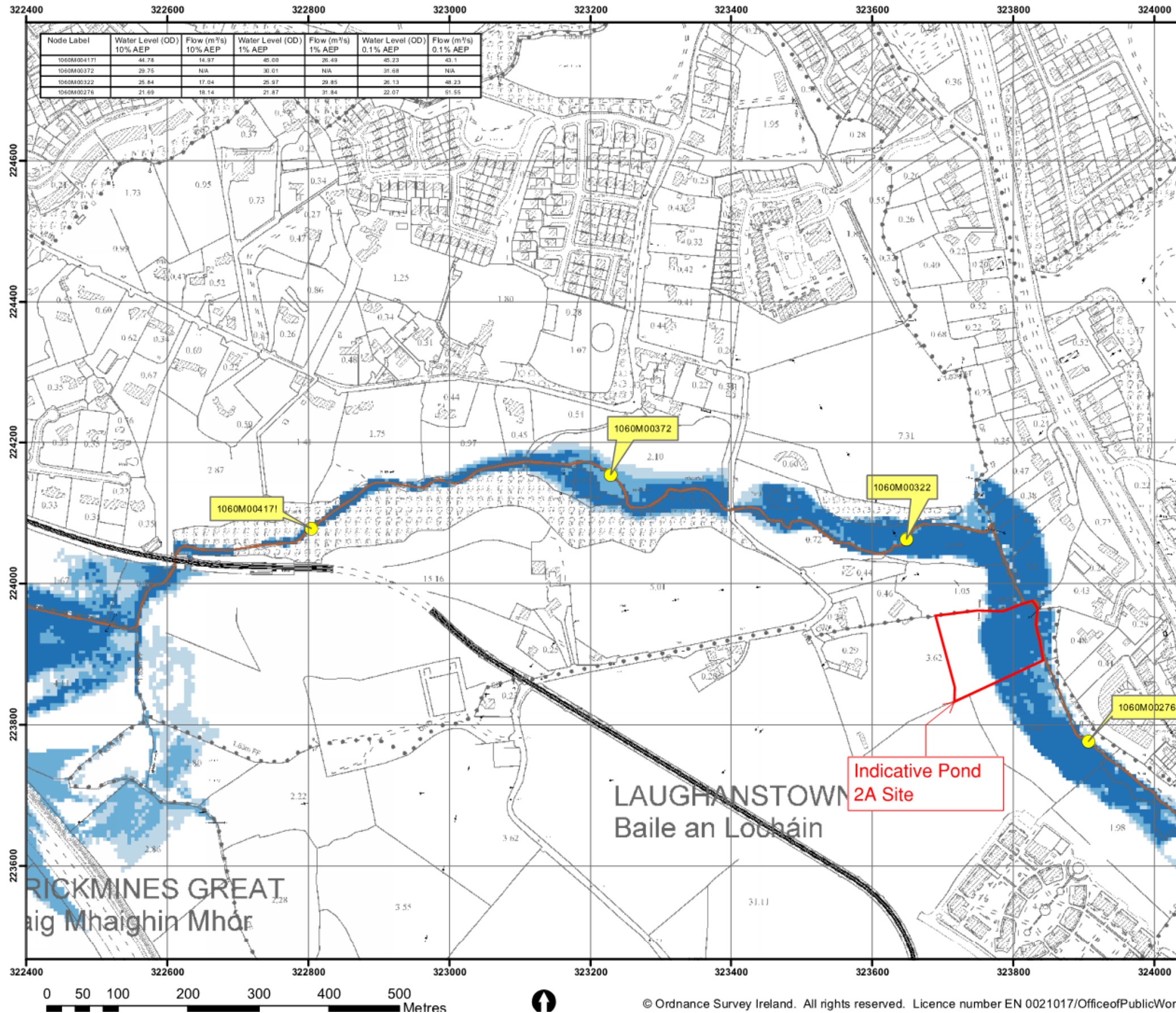
Vulnerability: The resilience of a particular group of people or types of property or habitats, ecosystems or species to flood risk, and their ability to respond to a hazardous condition and the damage or degree of impact they are likely to suffer in the event of a flood. For example, elderly people may be more likely to suffer injury, and be less able to evacuate, in the event of a rapid flood than younger people.

Source: *The definitions above are sourced from the DoEHLG Guidelines for Planning Authorities on ‘The Planning System and Flood Risk Management, 2009’ and Ciria 753 “the SuDS Manual”.*

APPENDIX B

INDICATIVE FLOOD SOURCES

Catchment Flood Risk Assessment and Management Study



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
 - Standard of Protection of Flood Defence (Walls / Embankments)
 - Node Point
 - Node Label

FINAL

REV.	NOTE	DATE
01	Removal of Embankments (Pg 5)	03/11/17



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

RPS
Elmwood House
74 Boucher Road
Belfast
BT12 6RZ
E: ireland@rpsgroup.com

Map: Shanganagh-Carrickmines River Fluvial Flood Extents	
Map Type:	EXTENT
Source:	FLUVIAL
Map Area:	HPW
Scenario:	CURRENT
Drawn By:	C.C. Date: 3 November 2017
Checked By:	A.S. Date: 3 November 2017
Approved By:	G.G. Date: 3 November 2017
Drawing No.:	E10LOU_EXFCD_F1_03
Map Series:	Page 3 of 9
Drawing Scale:	1:5,000 @ A3

OPW Flood Hazard Mapping


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 229 236

This Flood Report has been downloaded from the Web site www.floodmaps.ie. The users should take account of the restrictions and limitations relating to the content and use of this Web site that are explained in the Disclaimer box when entering the site. It is a condition of use of the Web site that you accept the User Declaration and the Disclaimer.



Map Scale 1:40,449

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.

17 Results

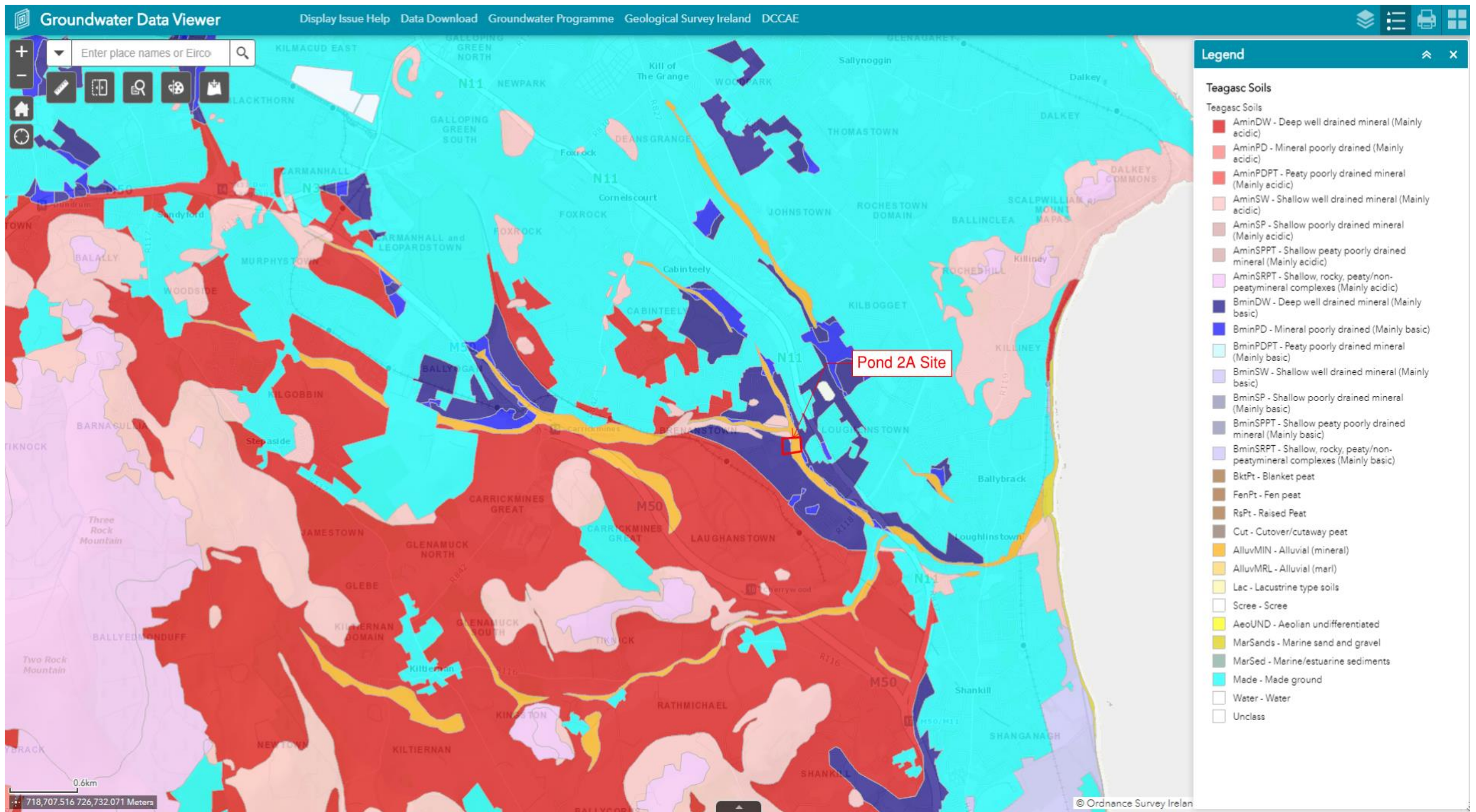
	1. Shanganagh Commons Road Nov 2002 County: Dublin	Start Date: 26/Nov/2002 Flood Quality Code:3
Additional Information: Reports (3) More Mapped Information		
	2. Shanganagh Carrickmines Nov 2002 County: Dublin	Start Date: 26/Nov/2002 Flood Quality Code:3
Additional Information: Reports (1) More Mapped Information		
	3. Shanganagh Carrickmines Dec 1997 County: Dublin	Start Date: 18/Dec/1997 Flood Quality Code:3
Additional Information: Reports (1) More Mapped Information		
	4. Shanganagh Carrickmines May 1993 County: Dublin	Start Date: 26/May/1993 Flood Quality Code:1
Additional Information: Photos (3) Reports (4) More Mapped Information		
	5. Shanganagh Commons Road May 1993 County: Dublin	Start Date: 26/May/1993 Flood Quality Code:1

Report Produced: 21-May-2020 11:06

Additional Information: Photos (4) Reports (6) More Mapped Information		
	6. Shanganagh Carrickmines Nov 1982 County: Dublin	Start Date: 06/Nov/1982 Flood Quality Code:3
Additional Information: Reports (3) More Mapped Information		
	7. Shanganagh Commons Road Nov 1982 County: Dublin	Start Date: 06/Nov/1982 Flood Quality Code:3
Additional Information: Reports (5) More Mapped Information		
	8. Shanganagh January 1980 County: Dublin	Start Date: 21/Jan/1980 Flood Quality Code:3
Additional Information: Reports (2) More Mapped Information		
	9. Shanganagh Commons Road Recurring County: Dublin	Start Date: Flood Quality Code:3
Additional Information: Reports (7) More Mapped Information		
	10. Flooding at Little Meadow, Pottery Road, Cabinteely, Dublin 18 on 24th Oct 2011 County: Dublin	Start Date: 24/Oct/2011 Flood Quality Code:2
Additional Information: Reports (1) More Mapped Information		
	11. Flooding at Commons Road, Shankill, Co. Dublin, on 24th Oct 2011 County: Dublin	Start Date: 24/Oct/2011 Flood Quality Code:2
Additional Information: Reports (1) More Mapped Information		
	12. Flooding at N11, Loughlinstown, Co. Dublin on 24th Oct 2011 County: Dublin	Start Date: 24/Oct/2011 Flood Quality Code:2
Additional Information: Reports (1) More Mapped Information		
	13. Shanganagh August 1986 County: Dublin	Start Date: 25/Aug/1986 Flood Quality Code:3
Additional Information: Reports (3) More Mapped Information		
	14. Deansgrange Johnstown Pottery Road Nov 1982 County: Dublin	Start Date: 05/Nov/1982 Flood Quality Code:3
Additional Information: Reports (1) More Mapped Information		
	15. Coolevin Ballybrack Feb 1980 County: Dublin	Start Date: 09/Feb/1980 Flood Quality Code:4
Additional Information: Reports (1) More Mapped Information		
	16. Deansgrange River Achill Road Recurring County: Dublin	Start Date: Flood Quality Code:3
Additional Information: Reports (4) More Mapped Information		
	17. Glenamuck Stream Glenamuck Road Recurring County: Dublin	Start Date: Flood Quality Code:4
Additional Information: Reports (2) More Mapped Information		

Report Produced: 21-May-2020 11:06

Geological Survey of Ireland: Teagasc Subsoil Mapping



Historical Maps: 6" Cassini

