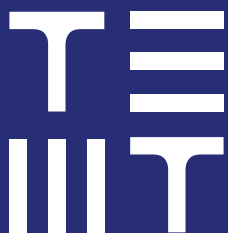


Residential Development
at Leopardstown Road
Flood Risk Assessment

10.02.2025

24094-X-XXX-RP-TNT-CE-0002



TENT ENGINEERING

Site Address:

Residential Development at
Leopardstown Road,
Sandyford,
Dublin 18

Client:

Dún Laoghaire–Rathdown County
Council

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Revision and Review

This report has been prepared for the sole benefit, use and information of the client. The liability of Tent Engineering with respect to the information contained in this report will not extend to any third party.

PURPOSE

P1	Information
P2	Coordination
P3	Planning
P4	Building Control
P5	Pre-tender
P6	Tender
P7	Construction

ACCEPTANCE (BY OTHERS)

S	Issued
A	Accepted
B	Accepted subject to comments
C	Rejected
D	Acceptance not required

Accepted by _____

Office address:

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REVISION(S)

Rev.	Description	Date
00	1st Issue	13.10.2024
01	2 nd Issue	10.02.2025

AUTHOR(S)

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REVIEWER(S)

Name

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Co-Founder, Director
Structural Engineer



BEng (hons) CEng MIEI FStructE

1 Executive Summary

Tent Engineering is appointed to provide a Flood Risk Assessment suitable for planning for a residential development at Leopardstown Road, Sandyford, Dublin 18.

The subject site consists of a greenfield plot. Planning permission seeks the demolition of the house and the construction of a two-storey, 20 unit block and a six-storey, 60 unit block residential dwelling.

All associated external amenity space, car parking space, cycle storage, and pedestrian accesses are also proposed.




According to the OPW flood maps, the site is not located within a potential flood zone. Following the site specific information available on flood maps, there is no low, medium or high flood risk shown on our site.

Past historic flood events near our site date back more than 4 decades and new improved flood defences have been installed since. Two reoccurring floods have been recorded in the wider vicinity of the site.

Our site is considered to be within Flood Zone C. The justification test is not needed. The proposed site level remains similar compared to the existing site level and no additional flood defence measures are necessary.

Surface water on site will be adequately dealt with as per the proposed Civil infrastructure report and drawings, that form part of this planning application. The proposed on-site impermeable areas are actively drained and discharge to a combined sewer. Attenuation storage volume is provided through green blue roofs with limited discharge velocity.

Proposals contained or forming part of this report represent the design intent and may be subject to minor alterations and adjustments through detailed design. Where such adjustments are undertaken as part of the detailed design and are deemed a material deviation from the intent contained in this document, prior approval shall be obtained from the relevant authority in advance of commencing such works. Where the proposed works to which this report refers are undertaken more than twelve months following the issue of this report, Tent Engineering shall reserve the right to re-validate findings and conclusions based on at that time latest information, at no cost to Tent Engineering.

Fluvial Risk (1% AEP)*	Tidal Risk (0.5% AEP)**	Climate Change***	Comments
			The proposed site level (equal or higher than existing ground level) is above the level obtained for fluvial flood risk, tidal flood risk and climate change simulation.

Flood Risk summary table

* 1% AEP is the 100-year returning period event (1 in 100 chance in any given year)

** 0.5% AEP is the 200-year returning period event (1 in 200 chance in any given year)

*** Potential climate change (increase in rainfall of 20% and sea level rise of 0.5m as recommended by OPW)

2 Introduction

2.1 Project

Tent Engineering is appointed to provide a Flood Risk Assessment suitable for a residential development at Leopardstown Road, Sandyford, Dublin 18.

The subject red line boundary encompasses a greenfield site and an existing 2 storey house. Planning permission seeks the demolition of the house.

2.2 Scope of Assessment

According to the OPW flood maps, the site is not located within a potential flood zone. Following the site specific information available on flood maps, there is no low, medium or high flood risk shown on our site.

The proposed site is considered to be in Flood Zone C. A stage 2 justification test is not needed.

Fig 2.1 - Site Location in Relation to the Regional Road Network



Fig 2.2 - Site Location in Relation to the Local Road Network



This indicates that the risk of flooding from rivers and sea is low. The stage 1 assessment is to be undertaken in accordance with the requirements of the Planning System and Flood Risk Management System.

The assessment:

- Investigates all potential risks of flooding to the site
- Considers the impact the development may have elsewhere with regards to flooding

The assessment reviews the following:

- OPW flood maps for ground water, rivers, and sea flooding
- Planning System and Flood Risk Management System information dated November 2009
- National Preliminary Flood Risk Assessment dated 2011
- Geological Survey Ireland (GSI) online map
- Historic Flood Events

3 Existing Site Details

3.1 History and current use

The site encompasses a greenfield area and a house along Leopardstown Road, near the M50 motorway. Previously, the site functioned as a quarry until the construction of the M50 motorway began in the 1990s, leading to the redevelopment of the land.

3.2 Existing Watercourses

The site is situated approximately 950 meters from the Barnicullia River and 500m from the Carrickmines Stream, small watercourses located in County Dublin, Ireland, that flow through from the foothills of the Dublin Mountains. Barnicullia River can be prone to flash flooding, especially during periods of heavy rainfall.

Fig. 3.1 - OSI Historic Map 1897 - 1913



Fig. 3.2 - Watercourses in Proximity to the Proposed Site



3.3 Existing Networks

No diversions are believed to be required. This is to be confirmed by a conclusive Site Investigation Survey prior to post-planning works.

3.4 Topography and FFL

The site is sloped, which mitigates risk of flooding. The Topographic map below shows the existing ground profile, indicating a general slope from the south-west (high ground) to the north-east (low ground).

No basement or substructure is currently present. The proposed ground level remains similar or higher compared to the existing site level.

Fig. 3.3 - Topography Map



4 Site & Flood Risk

4.1 Planning and Flood Risk

The Planning System and Flood Risk Management System (2009) provides guidance on how flood risk should be assessed during the planning and development process. There are three types of levels of flood zones defined:

- **Flood Zone A**
The probability of flooding from rivers and the sea is highest (greater than 1% or 1 in 100 for river flooding and 0.5% or 1 in 200 for coastal flooding)
- **Flood Zone B**
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 and 0.5% or 1 in 200 for coastal flooding)
- **Flood Zone C**
The probability of flooding from rivers and the sea is low (less than 0.1% or 1 in 1000 for both river and coastal flooding). Flood zone C covers all areas of the plan which are not in zones A or B.

Figure 4.1 - Classification of Vulnerability of Different Types of Development

Vulnerability class	Land uses and types of development which include*
Highly vulnerable development (including essential infrastructure)	<p>Garda, ambulance and fire stations and command centres required to be operational during flooding;</p> <p>Hospitals;</p> <p>Emergency access and egress points;</p> <p>Schools;</p> <p>Dwelling houses, student halls of residence and hostels;</p> <p>Residential institutions such as residential care homes, children's homes and social services homes;</p> <p>Careless and mobile home parks;</p> <p>Dwelling houses designed, constructed or adapted for the elderly or other people with impaired mobility; and</p> <p>Essential infrastructure, such as primary transport and utilities distribution including electricity generating power stations and sub-stations, water and sewage treatment, and potential significant sources of pollution (SEVESO sites, IPPC sites, etc.) in the event of flooding.</p>
Less vulnerable development	<p>Buildings used for retail, leisure, warehousing, commercial, industrial and non-residential institutions;</p> <p>Land and buildings used for holiday or short-term care/tourism and camping, subject to specific warning and evacuation plans;</p> <p>Land and buildings used for agriculture and forestry;</p> <p>Waste treatment (except landfill and hazardous waste);</p> <p>Mineral working and processing; and</p> <p>Local transport infrastructure.</p>
Water-compatible development	<p>Flood control infrastructure;</p> <p>Docks, marinas and wharves;</p> <p>Navigation facilities;</p> <p>Ship building, repairing and dismantling, dockside fish processing and refrigeration and compatible activities requiring a water-side location;</p> <p>Water-based recreation and tourism (including sleeping accommodations);</p> <p>Lifeguard and coastguard stations;</p> <p>Amenity open space, outdoor sports and recreation and essential facilities such as changing rooms; and</p> <p>Essential ancillary sleeping or residential accommodation for staff required by sites in this category (subject to a specific warning and evacuation plan).</p>

Following scrutiny of the OPW flood maps and floodinfo.ie, it has been identified that the existing site is not located within an area with documented potential flood risk.

4.2 Flood Zone Compatibility

The proposed development is considered to be a 'Highly Vulnerable Development'. The site is located within Flood Zone C, which results in the site being appropriate without further mitigations.

4.3 Justification Test

A justification test is not required to be undertaken at this stage.

4.4 Historic Flood Events

The OPW provides records for predictive and historic flood maps. These land maps have been consulted and interrogated regarding documented flood events in the vicinity of the subject site. It is noted that a reoccurring flood event, located approximately 700m from our proposed site, exists. However, this distance does not pose a significant risk to our site.

There have been 3 recorded river flooding events in the vicinity of the site, with 1 event originating from the Carrickmines Stream in 1980 and 2 events originating from the Barnacullia River, 1 in 1982 and 1 in 2011. The causes of these events were primarily due to inadequate flood defences at the time. Since then, significant flood defence measures have been installed by the Council, effectively mitigating the risk. There are 3 reoccurring flood events in the larger catchment area (>1km from site). Given the significant distance between the reoccurring flood events and our site, these reoccurring floods do not present a risk to our site.

Figure 4.1 - Matrix of Vulnerability versus Flood Zone to Illustrate Appropriate Development

	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

4.5 Hydrological Assessment

This study briefly assesses the risk from different types of flooding to the development and the risk of flooding of the proposed building, taking into consideration climate change, as well as how flood risks should be managed.

4.6 Fluvial Flooding

The site is located in Flood Zone C, and at low risk from fluvial flooding.

4.7 Pluvial Flooding

From the available information on the OPW Flooding Maps, there is no documented potential pluvial flood risk in the direct vicinity of the subject site. Surface water on site will be dealt with appropriately as outlined in our civil planning submission to ensure no local flooding nor site run-off occurs.

4.8 Tidal Flooding

Tidal flooding is the inundation of low lying areas, especially prevalent during exceptionally high tide events such as at full and new moons or rare storm events. The site is located within Flood Zone C and has a proposed level that is not lower than the existing ground level. The development is at the lowest risk from tidal flooding.

4.9 River Flooding

The Barnacullia River is located circa 950m away to the south and the Carrickmines stream is located circa 500m away to the west of the site. The development is not at risk of river flooding.

4.10 Groundwater flooding

In cases where ground water flooding occurs, it tends to be more persistent than other sources of flooding, typically lasting for weeks or months rather than hours or days. Groundwater flooding does not generally pose a significant risk to life due to the slow rate at which the water level rises; however, it can cause significant risk and damages to property if not considered accordingly.

Based on a soakaway on an adjacent site (deemed similarly applicable to our site), indicates a ground water table with water strike levels at considerable depth (>1.5m) below existing ground level.

4.11 Road and Network Flooding

From the available information there are no records of road drainage flooding in the direct vicinity of our proposed site.

No obvious records of flooding associated with our proposed site have been identified, other than mentioned in 'Historic Flood Events'.

Sewerage flooding is excluded from the study as they are typically localised and hence would generally cause limited damage. Sewer flooding typically arises from blockage or other unpredictable incidents, and so it cannot be readily projected where they would be likely to occur, and hence where significant flood risk due to this source might exist.

Providing Irish Water and Dun-Laoghaire Rathdown County Council maintain their drainage networks, it is assumed that the site will remain at low risk from public sewer and road drainage and infrastructure failures.

4.12 Flooding to the site

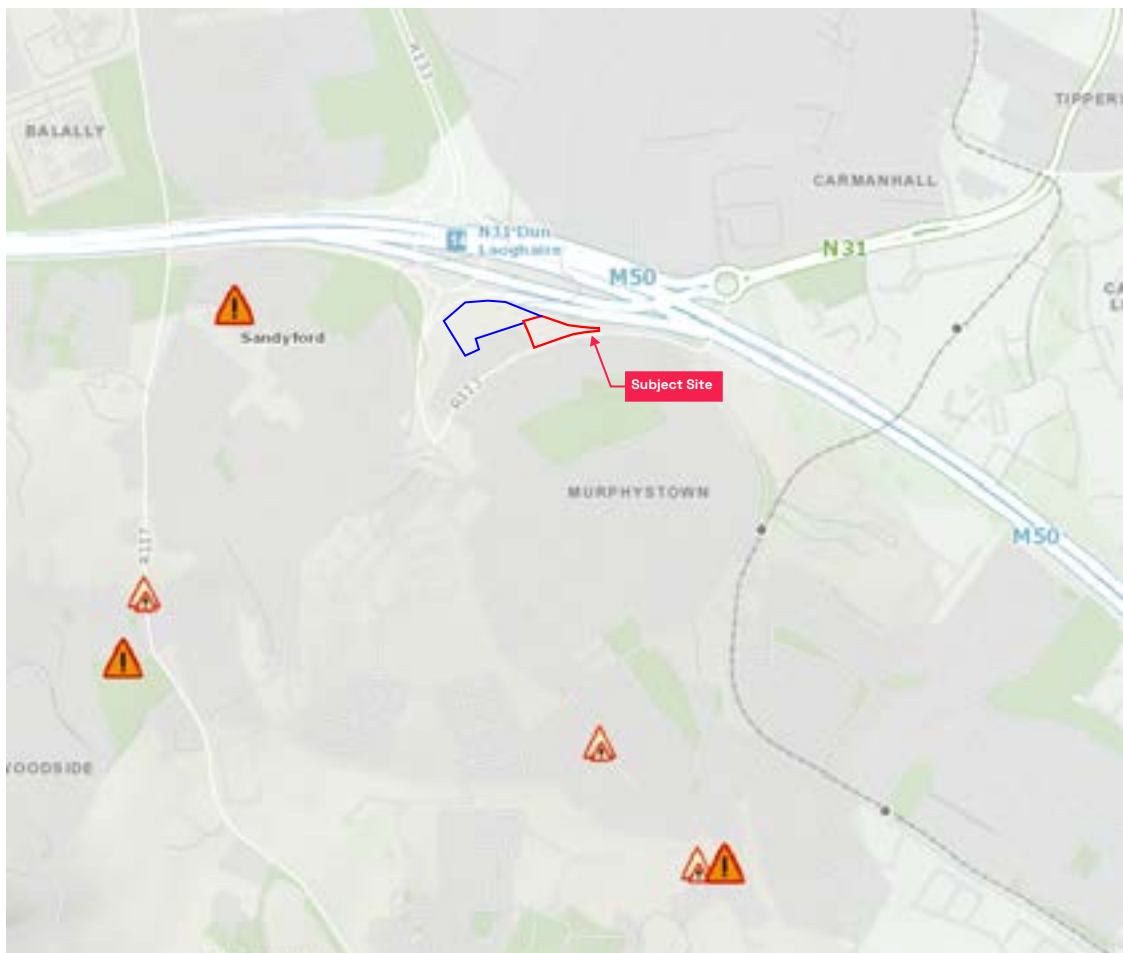
Surface water flooding can be caused when rainwater during extreme rainfall events does not drain away through the normal drainage system or soak into the ground at the desired rate, resulting in flood risk. Surcharging sewers can result in overland flows which if originating at a higher elevation than the development site can pose a flood risk.

As the surrounding developments are deemed to have appropriate on-site drainage, no past flood events are reported, and the general topography of the area is sloped, this is of no further added flood risk to our proposed site.

4.13 Flooding from the site

The design team is responsible for ensuring that the new development does not increase the flood risk elsewhere. The proposed surface water drainage network shall be designed to provide adequate capacity to convey all flows arising from the proposed development so as not to cause damage to the environment, ecosystems, buildings, essential services or adjoining developments and services. This is robustly addressed in our surface water strategy, ensuring minimum risk of volume and contaminant run-off from our site.

Fig. 5.1 - Past Flood Events in Vicinity of Site



5 Mitigation

5.1 Fluvial and Tidal Floods

No additional flood mitigation is required.

5.2 Groundwater Floods

No additional flood mitigation is required.

5.3 Surface Water to the site

No additional flood mitigation is required.

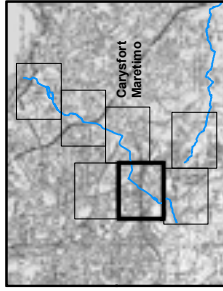
5.4 Surface Water from site

This is robustly addressed in our surface water strategy. A green-blue roof provides attenuation storage volume with a limited discharge velocity. Aco-drains or similar avoid storm water build-up at door openings. Soakaways reduce surface water buildup and prevent localized flooding. Tree pits use soil and root zones to absorb, store, and filter stormwater, reducing runoff and enhancing groundwater recharge.

The design team is not to increase the flood risk towards others as a result of the works. The residual risk can be considered low and no additional mitigation is required.

The final design of the drainage networks shall be in accordance with the relevant codes and regulations as set-out by the Office of Public Works, Dun-Laoghaire Rathdown County Council, Building Regulations and Irish Water.

6 Appendix A - Flood Maps



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

Legend

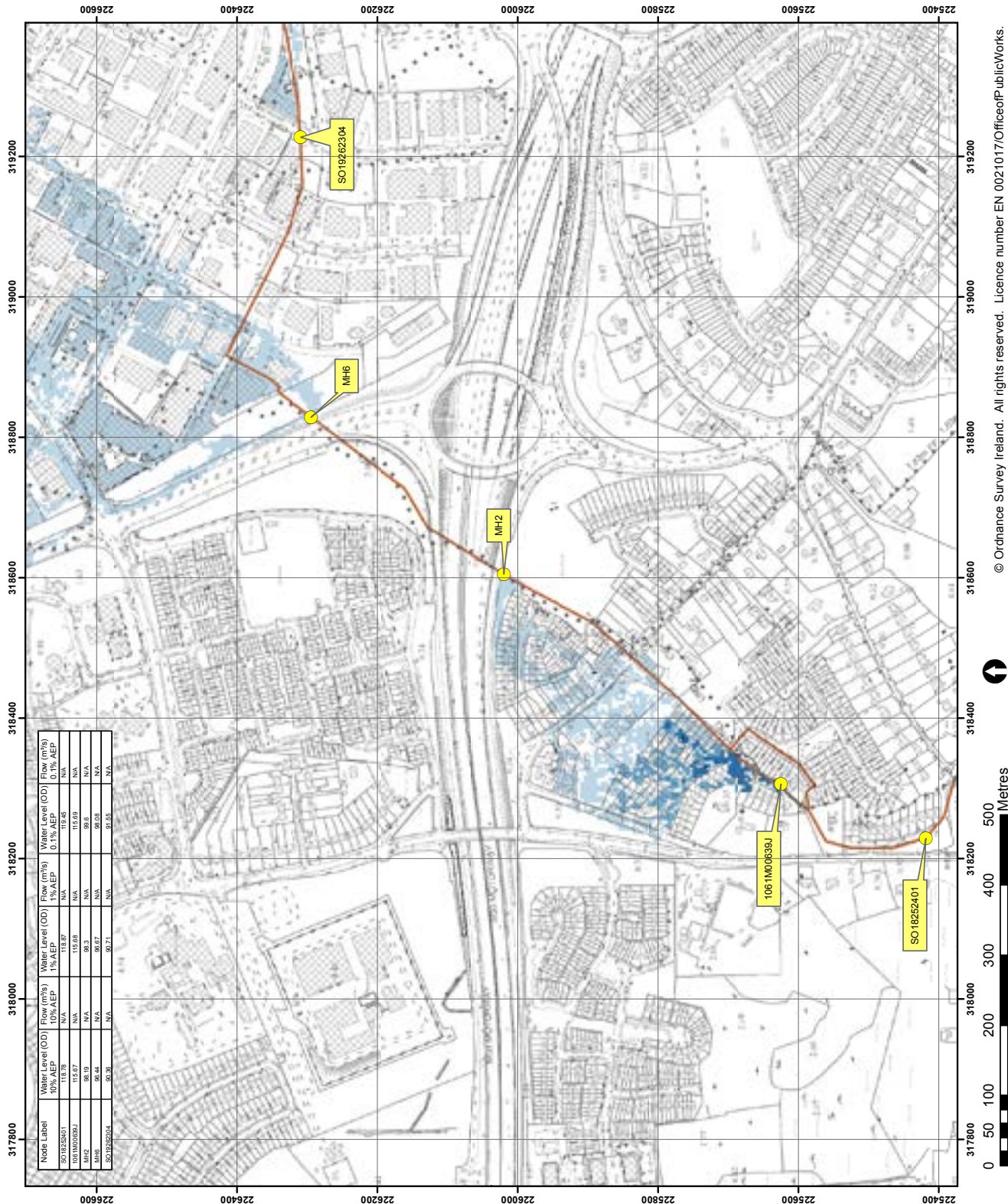
- 10% Fluvial/AEP Event
- 1% Fluvial/AEP Event
- 0.1% Fluvial/AEP Event
- Modelled River Centreline
- AFA Extents
- Embankment
- Wall
- Defeat Area
- Standard of Protection of Flood Defence (Walls / Embankments)
- 10% AEP
- 1% AEP
- 0.1% AEP
- Node Point
- Node ID
- Node Label

REV: _____ DATE: _____

NOTE: _____

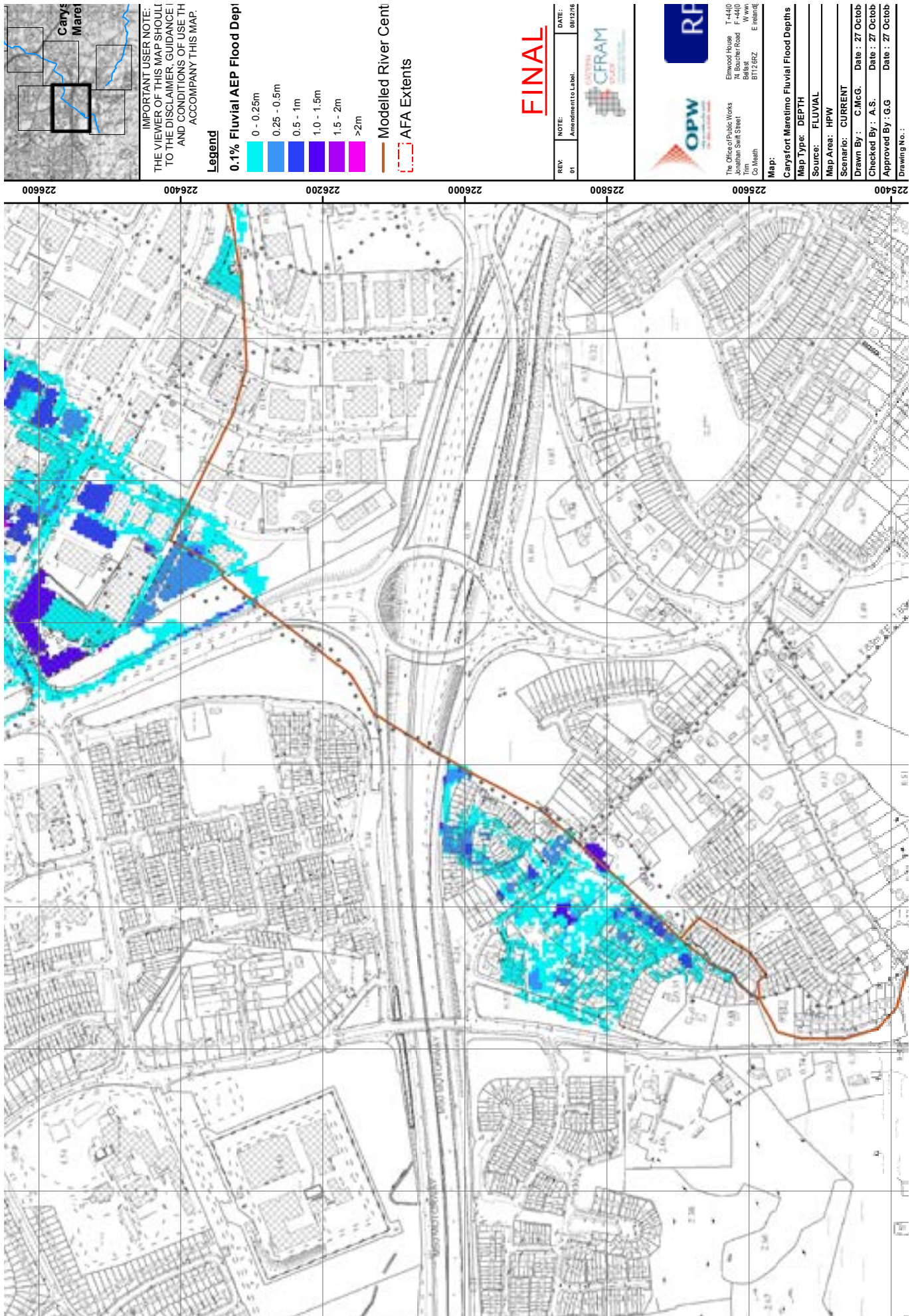


Map:
Carrigrohane Fluvial Flood Extents
Map Type: EXTENT
Sources: FLUVIAL
Map Area: HPW
Scenario: CURRENT
Drawn By: C.C. Date: 27 October 2017
Checked By: A.S. Date: 27 October 2017
Approved By: S.P. Date: 27 October 2017
Drawing No.: E09CAR_EXFCD_F2_04
Map Series: Page 4 of 7
Drawing Scale: 1:5,000 @ A3



Node Label	Water Level (OD)		Flow (m³/s)	
	10% AEP	1% AEP	10% AEP	1% AEP
SO192602304	115.78	115.87	N/A	N/A
1061M00639J	115.77	115.88	N/A	N/A
MH2	88.19	88.2	N/A	N/A
SO18252401	88.54	88.57	N/A	N/A
SO192602304	88.3	88.11	N/A	N/A

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IMPORTANT USER NOTE:
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 AND CONDITIONS OF USE THAT
 ACCOMPANY THIS MAP.

Legend

- 0.1% Fluvial AEP Flood Depth**
- 0 - 0.25m
 - 0.25 - 0.5m
 - 0.5 - 1m
 - 1.0 - 1.5m
 - 1.5 - 2m
 - >2m
- Modelled River Centre
 AFA Extents

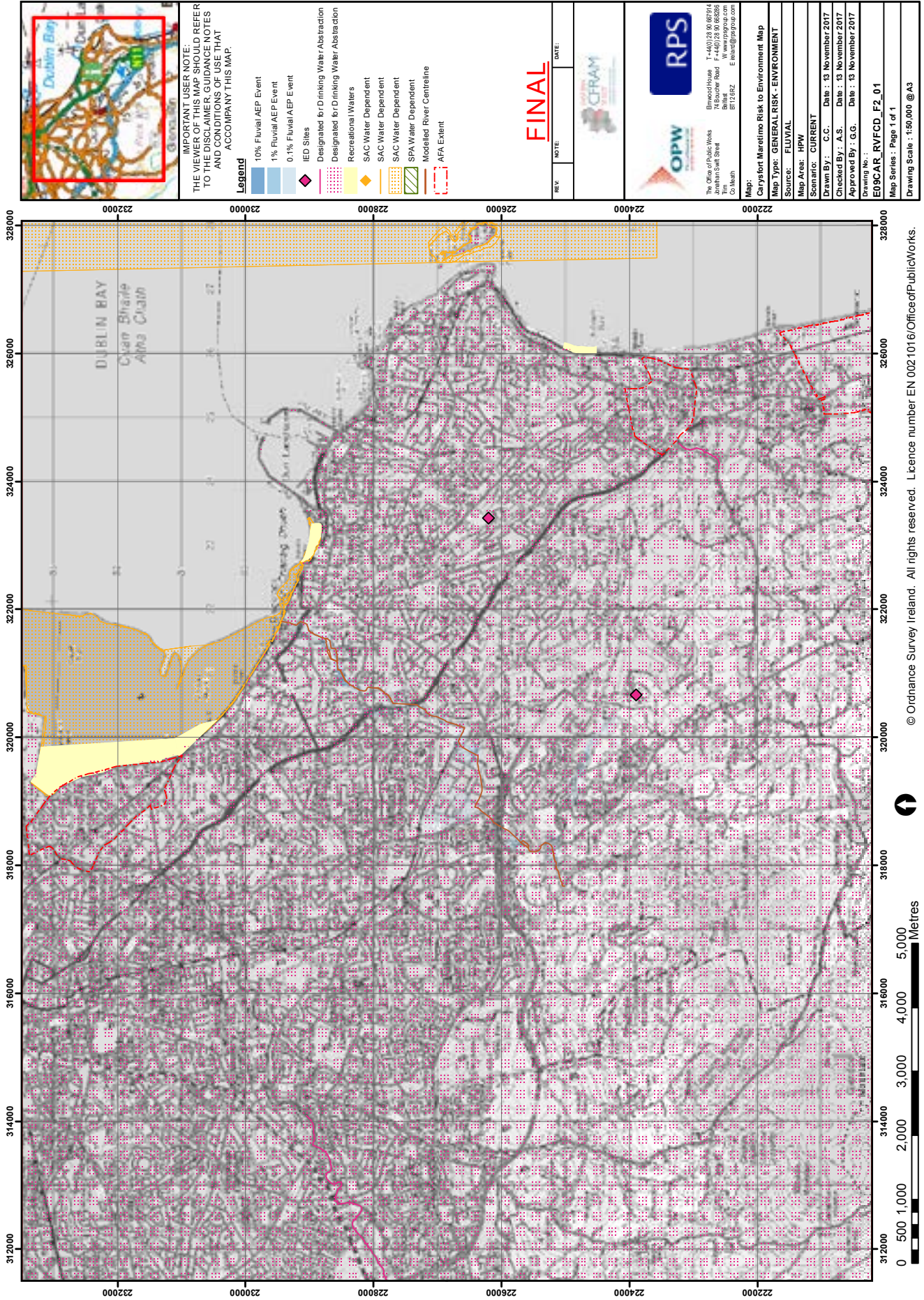
FINAL

REV:	NOTE:	DATE:
01	Amendment to label.	08/12/16



The Office of Public Works
 Jonathan Swift Street
 Dublin
 Co. Meath
 B12 6RZ
 E ireland@opw.ie

Map: Canyfort Maretime Fluvial Flood Depths	
Map Type: DEPTH	
Source: FLUVIAL	
Map Area: HPW	
Scenario: CURRENT	
Drawn By: C.McG.	Date: 27 Octob
Checked By: A.S.	Date: 27 Octob
Approved By: G.G.	Date: 27 Octob
Drawing No.:	



IMPORTANT USER NOTE:
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- Legend**
- 10% Fluvial AEP Event
 - 1% Fluvial AEP Event
 - 0.1% Fluvial AEP Event
 - IED Sites
 - Designated for Drinking Water Abstraction
 - Designated for Drinking Water Abstraction
 - Recreational Waters
 - SAC Water Dependent
 - SAC Water Dependent
 - SAC Water Dependent
 - SPA Water Dependent
 - Modelled River Centreline
 - AFA Extent

FINAL

REV.	NOTE:	DATE:

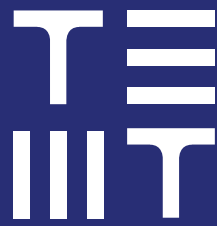
OPW **RPS**

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 W: www.opw.ie
 E: rps@rpsgroup.com

Map: Cryslort Maritime Risk to Environment Map

Map Type:	GENERAL RISK - ENVIRONMENT
Source:	FLUVIAL
Map Area:	HPW
Scenario:	CURRENT
Drawn By:	C.C. Date: 13 November 2017
Checked By:	A.S. Date: 13 November 2017
Approved By:	G.G. Date: 13 November 2017
Drawing No.:	ED9CAR_RVFCDF2_01
Map Series:	Page 1 of 1
Drawing Scale:	1:50,000 @ A3

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