



**Clifton Scannell Emerson**  
Associates

## Site Specific Flood Risk Assessment Unit 1, M50 Business Park

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Client: Creighton Properties LLC

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Date: 13<sup>th</sup> December 2022

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Job Number: 22\_112

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CONSULTING ENGINEERS

Civil Engineering   Structural Engineering   Transport Engineering   Environmental Engineering   Project Management   Health and Safety





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## Document Control Sheet

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## 1 Introduction

### 1.1 Background

CSEA was requested to undertake a Site Specific Flood Risk Assessment (SSFRA) to support the planning permission application submitted by Creighton Properties LLC at Unit 1, M50 Business Park, Ballymount, Dublin 12.

The proposed development of a brownfield site of approximately 0.86 Hectares. The subject site is located within M50 Business Park, Ballymount, Dublin 12 which lies approximately 10km southwest of Dublin's city centre and is accessed from the M50 and R148.

### 1.2 Development Description

The proposed development will consist of the change of use from warehouse to data repository facility, alterations to external facades, provision of a new 1100 mm parapet, reclad roof, internal alterations, refurbishment of the existing office space, solar panels at roof level, external plant at ground and roof levels and equipment to include 12 no. condenser modules, an emergency back-up generator and associated fuel storage tank, transformer, extension to the existing sub-station (c. 13 m<sup>2</sup>), 2 no. sprinkler tanks and pumphouse, bin store, 22 parking spaces including 2 electrical vehicle charging points, bicycle parking shelter, landscaping, planting, new security fence, external lighting, CCTV, altered vehicular gates, permeable hard surfaces, alterations to internal foul sewerage and water supply networks, provision of SuDS compliant surface water drainage system and all associated site works.

The application site area measures 0.86 ha. The extent of the site location plan is highlighted in Figure 1 below:-



Figure 1 – Proposed Site Location Plan

### **1.3 Background Information**

#### **1.3.1 Catchment-based Flood Risk Assessment and Management**

Catchment-based Flood Risk Assessment and Management (CFRAM) program has been implemented by the Office of Public Works (OPW) as a competent authority in Ireland for the EU floods directive. Over 29 Flood Risk Management Plans (FRMPs) have been prepared in coordination with the implementation of the Water Framework Directive (WFD). The FRMPs involved undertaking detailed engineering assessment and producing flood protection measures. The assessment addressed the potential impact of the proposed measures on waterbodies hydromorphology and quality status.

#### **1.3.2 OPW Flood Guidelines for Planning Authorities**

The purpose of The Planning System and Flood Risk Management Guidelines for Planning Authorities published by the OPW in 2009 (OPW Guidelines) is to introduce comprehensive mechanisms for the incorporation of flood risk identification, assessment and management into the planning process.

#### **1.3.3 Objectives of OPW Guidelines**

Floods can have broad range of impact on people, property, infrastructure and the environment. Flood can cause damage to the infrastructure including electricity and other utilities with significant detrimental impacts on local and regional economies. This may also cause long-term closure of businesses leading to economic loss other than the damage caused during the event. The core objectives of the OPW Guidelines include:

- Avoid inappropriate development in areas at risk of flooding;
- Avoid new developments increasing flood risk elsewhere, including that which may arise from surface water run-off;
- Ensure effective management of residual risks for development permitted in floodplains;
- Improve the understanding of flood risk among relevant stakeholders; and
- Ensure that the requirements of EU and national law in relation to the natural environment and nature conservation are complied with at all stages of flood risk management.

#### **1.3.4 Flood Risk Assessment FRA Key Concepts**

For carrying out a Site-specific Flood Risk Assessment (SSFRA), the OPW Guidelines recommend using Source-Path-Receptor concept model to identify where the flood originates from, what is the floodwaters path and the areas in which assets and people might be affected by such flooding (section 2.18 of the OPW Guidelines, 2009). Figure 2 show a schematic representation of S-P-R model.

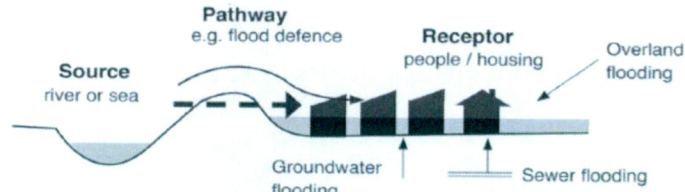


Figure 2 Source-Path-Receptor Model (extracted from OPW Guidelines, 2009)

The other key concept in flood management is the "Flood Risk". it is "the combination of the likelihood of flooding and the potential consequences arising". Consideration of flood risk must be addressed in terms of:

- The likelihood of flooding. Expressed as percentage probability or exceedance each year; and
- The consequences of flooding as the associated hazard e.g. flood depth and velocity.

Flood risk is then expressed with the relationship:

$$\text{Flood Risk} = \text{Likelihood of flooding} \times \text{Consequences of flooding.}$$

### 1.3.5 Flood Zones

Flood Zone is the spatial inundation area that fall within a range of likelihood of flooding. The OPW Guidelines specified three levels of flood zones:

**Flood Zone A** – where the probability of flooding from rivers and the sea is highest (greater than 1% Annual Exceedance Probability (AEP) or 1 in 100 for river flooding or 0.5% AEP or 1 in 200 for coastal flooding);

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

**Flood Zone C** – where the probability of flooding from rivers and the sea is low (less than 0.1% AEP 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.

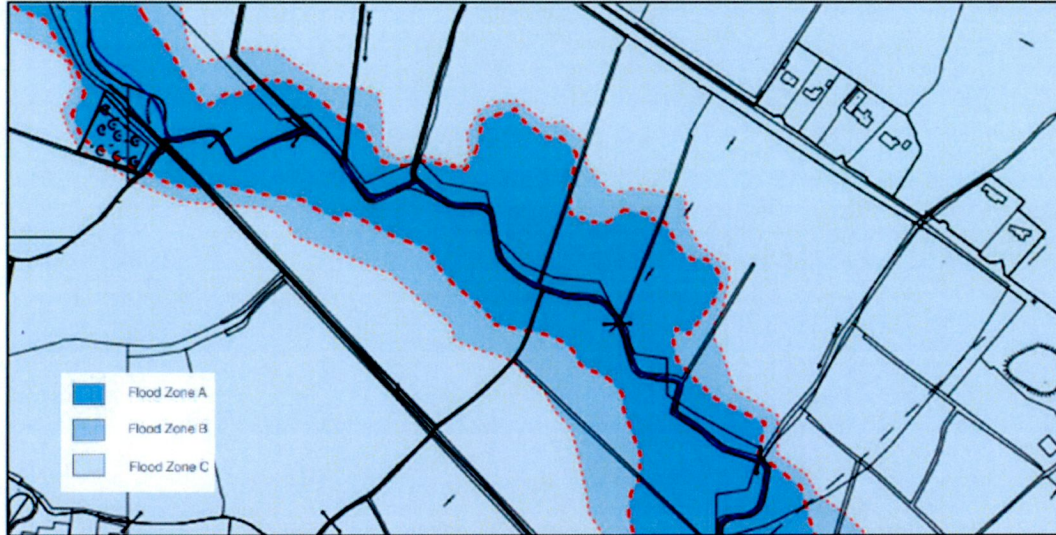


Figure 3 Example of the three flood risk zones (extracted from OPW Guidelines, 2009)

According to the OPW Guidelines, the planning implication of each of the zones mentioned above are:

**Zone A** - High probability of flooding. Most types of development would be considered inappropriate in this zone.

**Zone B** - Moderate probability of flooding. Highly vulnerable development, such as hospitals, residential care homes, Garda, fire and ambulance stations, dwelling houses and primary strategic transport and utilities infrastructure, would generally be considered inappropriate in this zone

**Zone C** - Low probability of flooding. Development in this zone is appropriate from a flood risk perspective (subject to assessment of flood hazard from sources other than rivers and the coast) but would need to meet the normal range of other proper planning and sustainable development considerations.

### 1.3.6 Sequential Approach

Sequential approach is an important tool used in the planning process which gives preference to locate a new development in the Low Flood Risk Zone and ensures that it does not have an adverse impact of flooding.

According to the sequential approach, If the development lies within a Flood Zone, it is required to consider measures for mitigating flood impact to an acceptable level. It is also required to provide justifications and strategic reasons for locating a proposed development on a higher risk flood zone (see Figure 4 and 5 below).

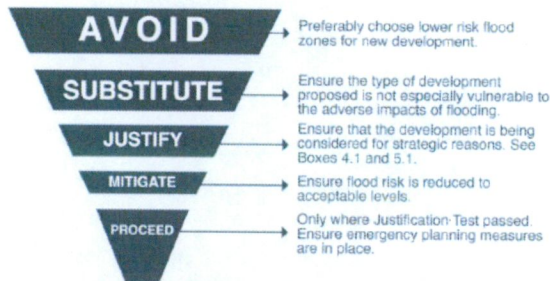


Figure 4 FRA Sequential Approach (extracted from OPW Guidelines, 2009)

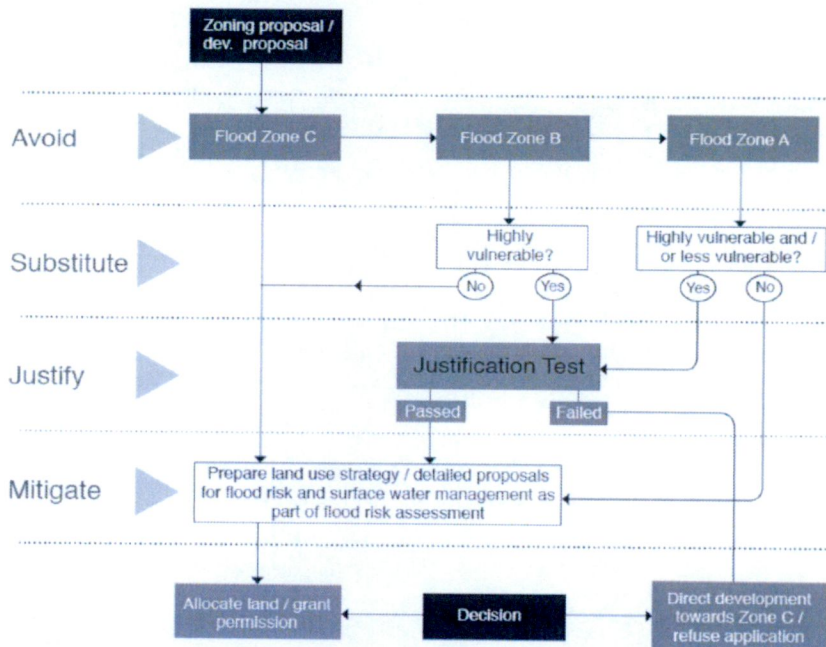


Figure 5 Sequential approach mechanism in the planning process (extracted from OPW Guidelines, 2009)

### 1.3.7 Development Classification

The OPW Guidelines provided three vulnerability categories based on the type of development which are:

- **Highly vulnerable:** This includes essential infrastructure, such as primary transport and utilities distribution, electricity generating power stations and sub-stations
- **Less vulnerable:** This category includes Land and buildings used for holiday or short-let caravans and camping, subject to specific warning and evacuation plans;



- **Water compatible:** Includes water-based flood control and recreational developments and other amenity open space, outdoor sports and recreation and essential facilities such as changing rooms.

The OPW Guidelines, as described in Section 2.2.4 of this report, sets out a sequential approach which makes use of flood risk assessment and classifies vulnerability of flooding of different types of development.

Table 3.2 of the OPW Guidelines illustrates those types of development that would be appropriate to each flood zone (reproduced in Table 1 below) and those that would be required to meet a Justification Test in accordance to Box. 5.1 in the Guidelines.

	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

**Table 1 Matrix of vulnerability versus flood zone (extracted from OPW Guidelines, 2009).**

## 2 Stage 1 - Flood Risk Identification

### 2.1 General

In this stage of the FRA, we use the existing information to identify any flooding issues related to the site that may require any further investigation.

### 2.2 Source of Information

Information source reviewed for flood risk identification are listed in table 2 below:

	Information Source	Remarks
1	Information on watercourse and streams in the study area such as those available from OS Maps, EPA and GeoHive	An extract from EPA map viewer <a href="https://gis.epa.ie/PAMaps/">https://gis.epa.ie/PAMaps/</a> ; with active <i>stream</i> and <i>flow direction</i> layers in Figure 6 shows the Robinhood Stream running to the northeast of the proposed site.
2	Predictive fluvial, coastal, pluvial and groundwater flood maps available on CFRAMS mapping obtained for the site from <a href="https://www.floodinfo.ie/map/floodmaps/">https://www.floodinfo.ie/map/floodmaps/</a>	The proposed development is located outside the extents of the 1 in 1000 year (0.1% AEP). Refer to CFRAMS mapping in <b>Appendix B</b> .
3	Geophysical Survey by Gecom reported on 14 December 1987.	Groundwater seepages identified at depths ranging from 3.0m to 3.5m.

Table 2 Information Source Consulted

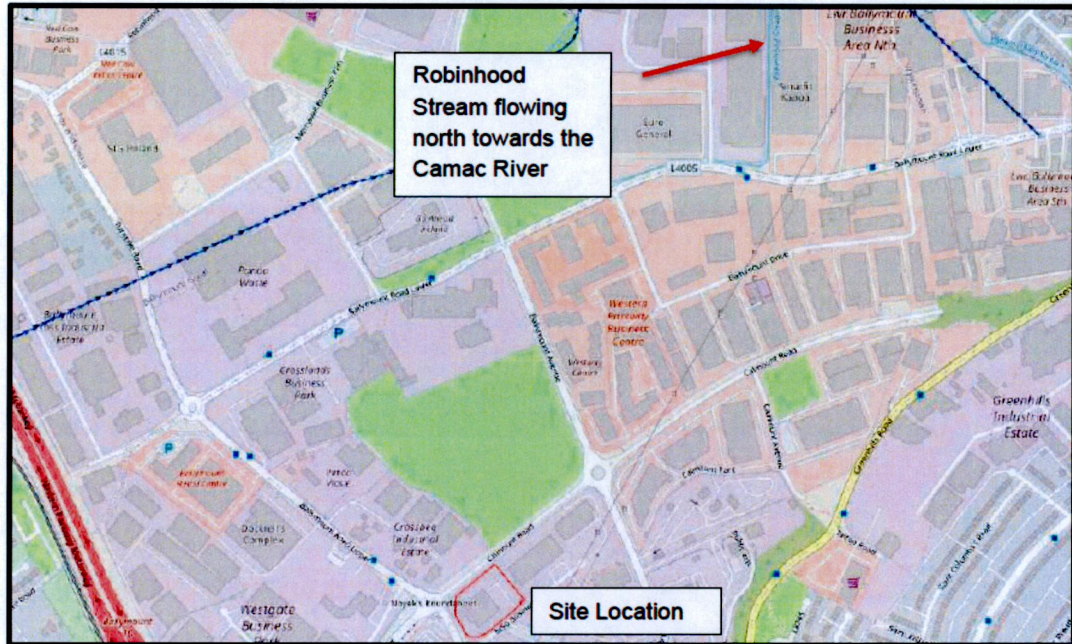


Figure 6 – Extract from EPA Mapping indicating Robinhood Stream located northeast of the site.

### 2.3 Source-Path Receptor

A Source-Pathway-Receptor model has been produced to assess the possible sources of floodwater and their likelihood, the pathways by which flood water reaches receptors and the receptors that could be affected by potential flooding, as summarized in Table 2 below.

Source	Path	Receptor	Likelihood	Impact	Risk
<b>Tidal</b>	Tidal flooding from coasts 1.3 km away from the site	People and Property (the proposed development).	Remote	High	Very Low
<b>Fluvial</b>	Flooding from the Camac River.	People and Property (the proposed development).	Remote - is not subject to flooding in the 1:1000 year event.	High	Very Low
<b>Pluvial/Surface Water</b>	Flooding from surcharging of the development's proposed surface water network	People and Property (the proposed development).	Possible	High	Moderate
<b>Pluvial/Surface Water</b>	Flooding from rise in water levels in the attenuation basins	People and Property (the proposed development).	Possible	High	Moderate
<b>Ground Water</b>	Rising GWL on the site	People and Property (the proposed development).	Possible	High	Moderate
<b>Other Source</b>	Flooding due to human or mechanical error in sizing of Petrol interceptor or the hydrobrake/ blockage at any drainage system component.	People and Property (the proposed development).	Possible	High	Moderate

Table 2 Source-Path-Receptor analysis

From the SPR analysis presented above, it is noted that the proposed development site is not subject to tidal (Coastal) or fluvial flooding and therefore very low risk of flooding. However, Moderate risk remains from internal drainage system service to the development.

### 3 Stage 2: Initial Flood Risk Assessment

#### 3.1 Fluvial Flooding

OPW flood mapping for the site was reviewed – See extract from CFRAMS mapping (Refer to Appendix B) in Fig 7 below.

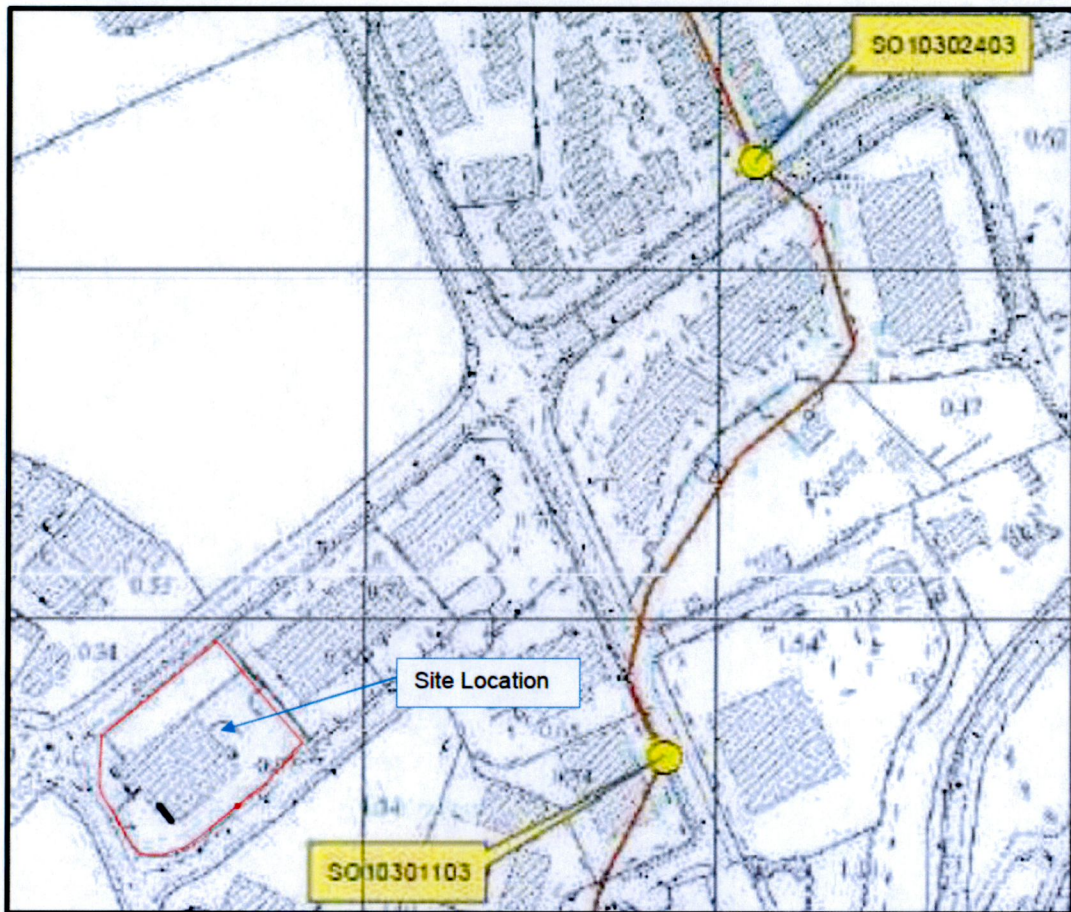


Fig 7 – OPW Flood Mapping CFRAMS

As can be seen above the site is not subject to flood in the 1:1000 year event (0.1% AEP) and falls within Flood Zone C.

There is no history of flood on the site. See extract from The Past Flood Event Local Area Summary Report in Fig 8 below which is included in **Appendix C** to this report.

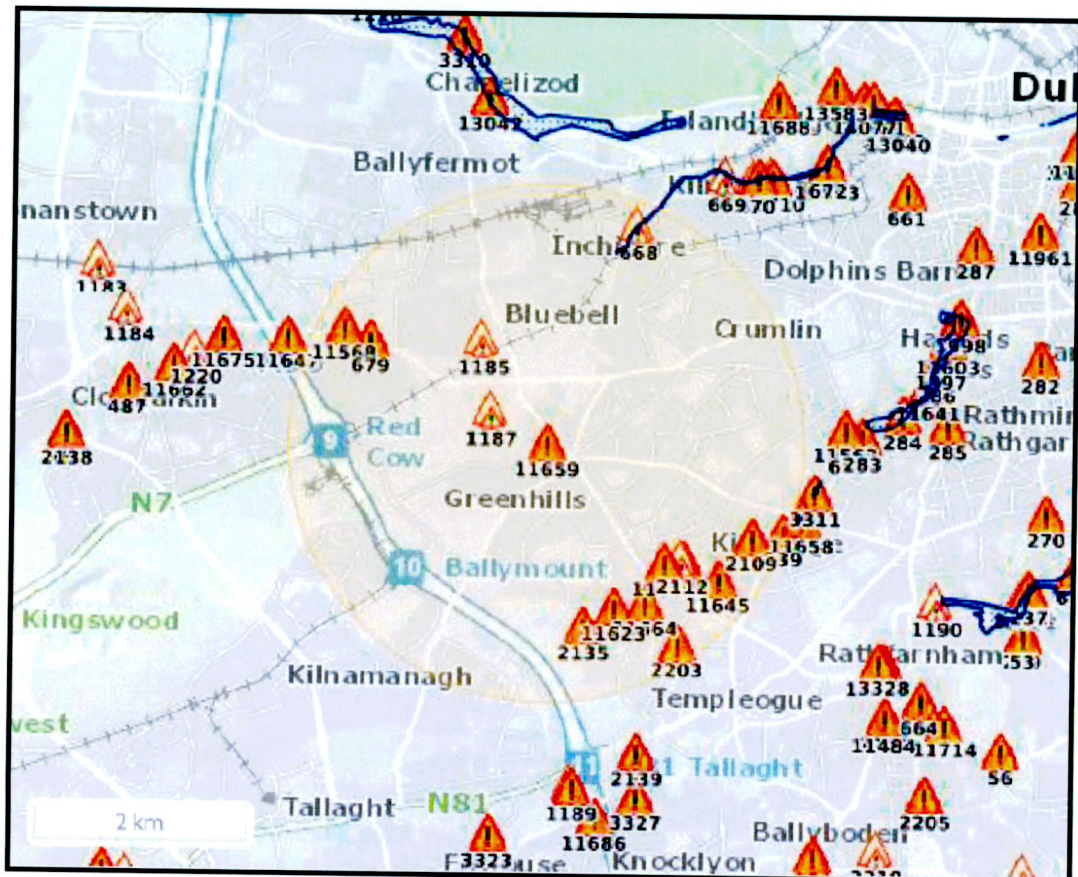


Fig 8 – Past Flood Events

### 3.2 Pluvial Flooding from Surface Water Drainage

The Source-Pathway-Receptor model presented in Stage 1 indicated the likelihood of Fluvial and Pluvial flooding types within the site. The identified risk of flooding in the study area is primarily associated with the future drainage networks service to the proposed development (see Figure 8).

The drainage system has a potential to cause local flooding unless it is designed in accordance with the regulations e.g. Greater Dublin Strategic Drainage Study (GSDS) and to take account of flood 100-year storm return periods plus 20% allowance for climate change.

Proper operation and maintenance of the drainage system should be implemented to reduce the pluvial flood risk due to human/ mechanical error. **Appendix A** presents a proposed Operation and Maintenance O&M Plan for the drainage system in the development.

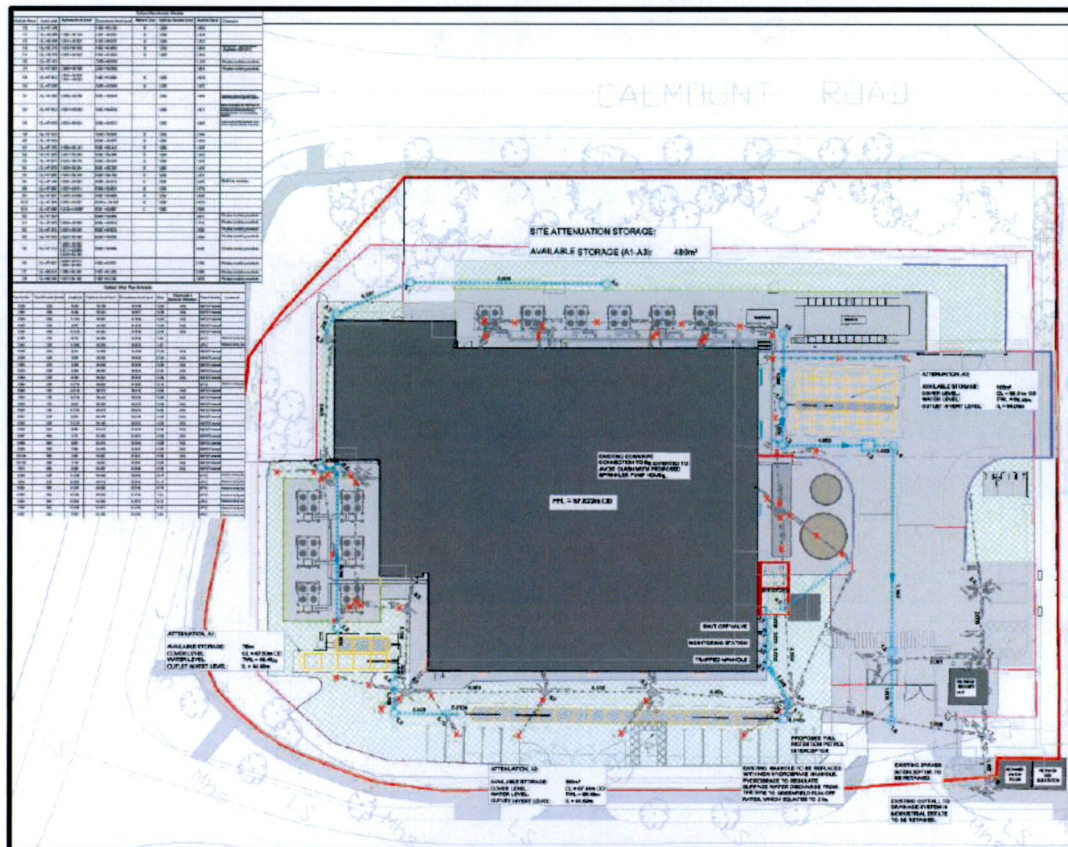


Fig 9 – Proposed Site Drainage Network

### 3.3 Ground Water Flooding

A historical geotechnical investigation was carried out by Geocom on the 14<sup>th</sup> of December 1987. Groundwater seepages were identified at depths ranging from 3 to 3.5m below ground. No historical flooding has been reported in the vicinity of the site and the external surface water network of the M50 Business Park, just outside the site boundary, is approximately 4m deep.

### 3.4 Flood Zone Category

Following the assessment of the flood risks to the site and the available information it is considered that the proposed site is located within Flood Zone C as per the OWP Guidelines and as indicated by the CFRAMS maps – refer to **Appendix B**. Therefore, the proposed development on the subject site is appropriate for this flood zone category, and a justification test is not required.

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## 4 Conclusion

This Flood Risk Assessment for the proposed development was undertaken to the requirements of the OPW Guidelines, 2009, "Planning System and Flood Risk Management Guidelines for Planning Authorities". Following the flood risk assessment stages, it was determined that the site is within Flood Zone C as defined by the Guidelines and based on the CFRAMS mapping. Therefore, the development on the subject site is appropriate for the site's flood zone category and a justification test as outlined in the Guidelines is not required. The Guidelines sequential approach is met with the 'Justify' & 'Mitigate' principals being achieved. A regularly maintained drainage system would ensure that the network remains effective and in good working order should a large pluvial storm occur.



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Project: Unit 1, M50 Business Park

Title: Site Specific Flood Risk Assessment

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## **Appendix A Surface Water Operation and Maintenance (O&M) Activities**

All operation and maintenance activities should be in accordance to the following guidelines:

- Greater Dublin Strategic Drainage Study GSDSDS- Volume 3 – Environmental Management
- CIRIA 2015SuDS Manual, Part E - Chapter 32

Considerations for surface water O&M:

Requirement	Assessment/Action
<b>Maintenance access – ensuring appropriate and long-term access to all points in the system where future maintenance may be required</b>	A standard minimum of 600mm diameter opening is provided for all manhole, chambers and treatment system. Removable gullies grate opening with a minimum size of 450mm X 320mm.
<b>Forebays and/or appropriate pre-treatment structures to facilitate the sediment management process.</b>	Service manholes are proposed upstream and downstream of the attenuation system. Road gullies and the petrol interceptor will also facilitate sediment management process.
<b>Bypass systems or appropriate temporary drainage infrastructure for use if required during sediment management or other maintenance activities.</b>	Not required
<b>The availability of disposal areas for organic arisings (green waste) and sediments.</b>	To be included as part of maintenance contract of the development.

Types of SuDS systems used that require O&M activities:

- **Attenuation Systems:** 3no. attenuation systems.
- **Soakaway:** N/A.
- **Pervious Paving:** proposed permeable paving areas proposed within the development area
- **Treatment system:** proposed petrol interceptor as part of road and parking drainage system

O&M activities required as following:

Operation and maintenance activities	SuDS Component			
	Attenuation Tank	Soakaway	Pervious Paving	Treatment System
O&M Activities				
<b>Regular maintenance</b>				
Inspection	■	■	■	■
Litter/debris removal	■		■	
Grass cutting			■	
Weed/invasive plant control	■		■	
Shrub management			■	■
Shoreline vegetation management				
Aquatic vegetation management				
<b>Occasional maintenance</b>				
Sediment management	■	■	■	■
Vegetation/plant replacement				
Vacuum sweeping and brushing			■	
<b>Remedial maintenance</b>				
Structure rehabilitation/repair	□	□		□
Infiltration surface reconditioning		□		
■ Will be required				
□ May be required				

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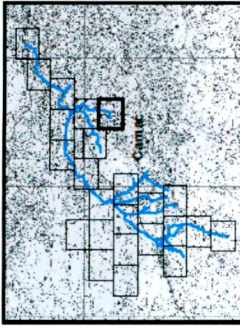
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## **Appendix B CFRAMS Mapping**



**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
	Deemed Area
	Standard of Protection of Flood Defence (Walls / Embankments)
	10% AEP
	Node Point
	Node D
	Node Label

**FINAL**

REV	NOI (Type of Issue) / Date (Pp. 21)	DATE
01	Revision of Def. Area (Pp. 21)	13/11/2017



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**Map:** Camac Fluvial Flood Extents

**Map Type:** EXTENT

**Source:** FLUMAL

**Map Area:** HPW

**Scenario:** CURRENT

**Drawn By:** C.M.G. Date: 13 November 2017

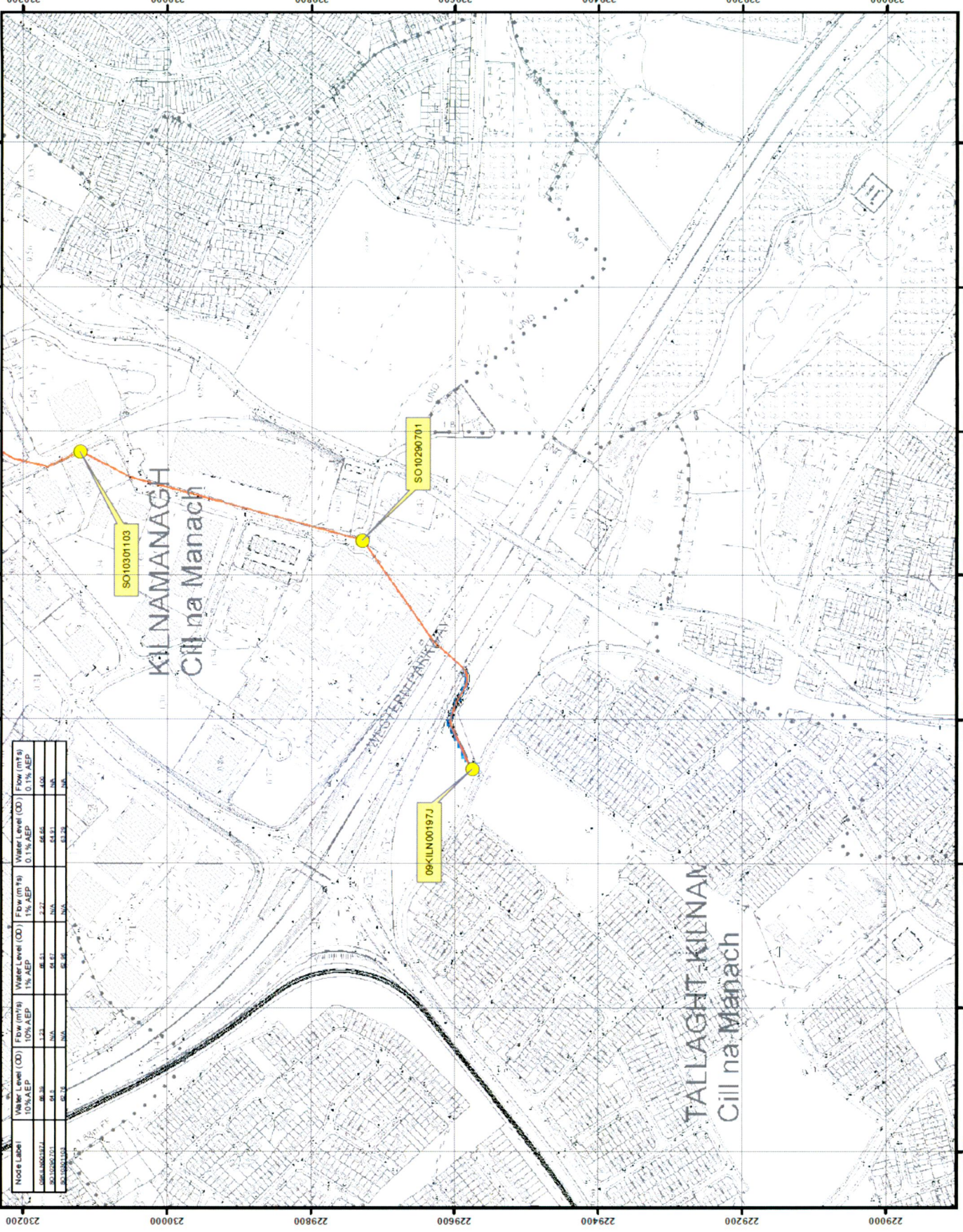
**Checked By:** A.S. Date: 13 November 2017

**Approved By:** S.P. Date: 13 November 2017

**Drawing No.:** E09CAM\_EXFCD\_F1\_20

**Map Series:** Page 20 of 24

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



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
09KILN001971	66.31	7.27	66.65	4.08	66.99	2.28
SO10301103	64.4	N/A	64.87	64.81	65.34	N/A
SO10290701	66.72	N/A	66.26	63.29	63.29	N/A