



KAVANAGH  
MANSFIELD  
&PARTNERS  
CONSULTING  
STRUCTURAL  
AND CIVIL  
ENGINEERS

## DWELLINGS AT OUTLANDS

### RATHBEALE ROAD

### SWORDS

### PRELIMINARY FLOOD RISK ASSESSMENT

28 MAY 2019

#### **1.0 INTRODUCTION**

- 1.1 Kavanagh Mansfield & Partners, Consulting Engineers were commissioned by the applicant to prepare a Site Specific Flood Risk Assessment (SSFRA) for the proposed residential development at Outlands, Rathbeale Road, Swords. This SSFRA will form part of the supporting documentation to be lodged with the Planning Application.
- 1.2 The purpose of this assessment is to provide the Planning Authority with the necessary information on local flood risks pertaining to the proposed development. The report will assess the development proposals in accordance with guidance referred to in 1.4 below.

The report will investigate;

- The sites Flood Zone category
- Other flood risk parameters
- Any flood mitigation measures required and management of any residual flood risk

- 1.3 This SSFRA relates only to the site at Outlands, Rathbeale Road, Swords and deals with the existing site and the proposed development. The proposed development consists of the construction of an 11 unit apartment block with car parking at ground level, adjacent to the building.
- 1.4 This report follows the guidelines of "The Planning System and Flood Risk Management - Guidelines for Planning Authorities" hereinafter referred to as the Guidelines
- 1.5 The nearest water course is the Broadmeadow River, which is a considerable distance north of the site.



## 2.0 SITE DETAILS

- 2.1 The site is located at the junction of Rathbeale Road and Pine Grove Park and currently contains Existing buildings. See site plan below.



## 3.0 FLOOD RISK PARAMETERS

- 3.1 The likelihood of flooding is defined as the probability of the occurrence of a storm of given severity in any given year. Traditionally, this has been expressed as a return period (e.g. 1 in 100 year return period). However, this has led to misconceptions about the likelihood of repeat occurrences. A more definitive 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. A 1 in 100 year return period flood event is therefore expressed as a 1% AEP flood event. Likewise, a 1 in 1 year return period flood event is expressed as a 100% AEP flood event.
- 3.2 The consequences of flooding depend on the hazards associated with it such as depth and speed of water, vulnerability of people and property to it. Flood risk is then expressed as Likelihood of Flooding x Consequences of Flooding.



- 3.3 The Greater Dublin Strategic Drainage Study (published by the Local Authorities in the Greater Dublin Region), the Guidelines and the SFRA Vol. 7 of the Dublin City Development Plan sets out the best practice standards for flood risk in Ireland.
- 3.4 The SFRA Vol. 7 requires that ground floor levels of houses be provided with a minimum of 300mm freeboard over the 1% AEP fluvial flood level.
- 3.5 Both the SFRA Study and the Guidelines require that account be taken of the effects of climate change over the design life of a development, normally 100 years. Design parameters to take account of climate change were established in the GDSDS and revised following later studies (as advised by Dublin City Council). These parameters are set out in Table 1.

Design Category	Impact of Climate Change
Drainage	20% increase in rainfall
Fluvial (River)	20% increase in flood flow
Tidal/Coastal	Min FFL of 4.0 – 4.15m AOD

Table 1: Climate Change – Impact on Design Parameters

- 3.6 The Guidelines and SFRA Vol. 7 adopt a sequential approach to managing flood risk by reducing exposure to flooding through land-use planning. The aim of the Guidelines is to avoid developments in areas at risk of flooding, especially flood plains, to encourage appropriate development for a given area where flood risk can be reduced or managed to an acceptable level without increasing flood risk elsewhere. The approach adopted by the Guidelines establishes three zones (Guidelines paragraph 2.23) on a reducing scale of flood risk – see Table 2.

Zone A	High Probability of Flooding Where the annual probability of flooding is: Greater than 1% AEP for fluvial flooding or Greater than 0.5% AEP for coastal flooding
Zone B	Moderate Probability of Flooding Where the annual probability of flooding is: Between 0.1% AEP and 1% AEP for fluvial flooding or Between 0.1% AEP and 0.5% AEP for coastal flooding
Zone C	Lower Probability of Flooding Where the annual probability of flooding is: Less than 0.1% AEP fluvial flooding and Less than 0.1% AEP for coastal flooding

Table 2: Flood Risk Zones

- 3.7 Flood risk zones are determined on the basis of the probability of river and coastal flooding only (Guidelines paragraph 2.24). Other sources of flooding (such as groundwater, infrastructure and pluvial) do not affect the determination of flood risk zones. These other sources of flooding will be considered and mitigated in design. Flood risk zones are determined on the basis of the current flood risk, i.e. without the inclusion of climate change factors (Guidelines paragraph 2.24).



- 3.8 The Guidelines classify potential development in terms of its vulnerability to flooding. The types of development falling within each vulnerability class are described in Table 3.1 of the Guidelines, which is reproduced in Table 3.

Vulnerability Class	Land uses and types of development which include:
Highly vulnerable Development (including essential infrastructure)	Garda, ambulance and fire stations and command centres required to be operational during flooding; Hospital; Emergency access and egress points; Schools; Dwelling houses, student halls of residence and hostels; Residential institutions such as residential care homes, children's homes and social services home; Caravans and mobile home parks; Dwelling houses designed, constructed or adapted for the elderly or, other people with impaired mobility; and Essential infrastructure, such as primary transport and utilities distribution, including electricity generating power stations and substations, water and sewage treatment, and potential significant sources of pollution (SEVESO sites, IPPC sites, etc.) in the event of flooding.

Less vulnerable development	Buildings used for: retain, leisure, warehousing, commercial, industrial and non-residential institutions; Lands and buildings used for holiday or short-let caravans and camping, subject to specific warning and evacuation plans; Land and buildings used for agriculture and forestry; Waste treatment (except landfill and hazardous waste); Mineral working and processing; and Local transport infrastructure.
Water-compatible Development	Flood control infrastructure; Docks, marinas and wharves; Navigate facilities; Ship building, repairing and dismantling, dockside fish processing and refrigeration and compatible activities requiring a waterside location; Water-based recreation and tourism (excluding sleeping accommodation); Lifeguard and coastguard stations; Amenity open space, outdoor sports and recreation and essential facilities such as changing rooms; and Essential ancillary sleeping or residential accommodation for staff required by uses in this category (subject to a specific warning and



	evacuation plan).
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*Table 3: Development Vulnerability Class*

- 3.9 The Guidelines define the zones in which each class of development is appropriate – this is summarised in Table 4. The Guidelines recognise that flood risks should not be the only deciding factor in zoning for development. The Guidelines recognise that circumstances will exist where development of a site in a floodplain is desirable in order to achieve compact and sustainable development at the core of urban settlements. In order to allow consideration of such development, the Guidelines provide a Justification Test, which establishes the criteria under which desirable development of a site in a floodplain may be warranted.

	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 4: "Appropriateness" Matrix*

## 4.0 RISK ASSESSMENT

### 4.1 Fluvial Risk Assessment

- 4.1.1 A copy of the OPW Flood Risk Assessment Map (FRAM) indicated that the site is in Flood Zone C which is low risk and appropriate for residential development. A copy of the FRA map is contained in Appendix A and the site location is marked yellow.
- 4.1.2 Based on the Node label 4Bae1386 closest to the site the highest water level is 25.75m OD. The proposed finished floor level for the development is 26.05m OD which is 300mm above this level. The risk of flooding from a 0.1% AEP Fluvial event is negligible.

### 4.2 Pluvial Risk Assessment

- 4.2.1 The site is relatively flat with the general topography sloping gently to the south east.

- 4.2.2 There is a possibility that the existing road drainage system might overflow or that the watermain may fracture. However, the probability of those two scenarios occurring is not increased by the proposed development. Neither is the risk to neighbouring sites increased by the proposed development.

## 5.0 CONCLUSIONS

- 5.1 The proposed development is in Flood Zone C which is appropriate and safe for residential development. The finished floor level is above the water level predicted for the 0.1% AEP event.



- 5.2 The proposed development is not on a flood plane, nor is it near the coast, nor does it increase the risk of flooding to neighbouring properties.
- 5.3 The proposed development results in a decreased impermeable area which reduces run off quantity relative to the current run off quantity, which reduces the load on the drainage system.

*Gerry Donnelly*

For

**KAVANAGH MANSFIELD & PARTNERS**  
Consulting Engineers

**CONDITIONS:**

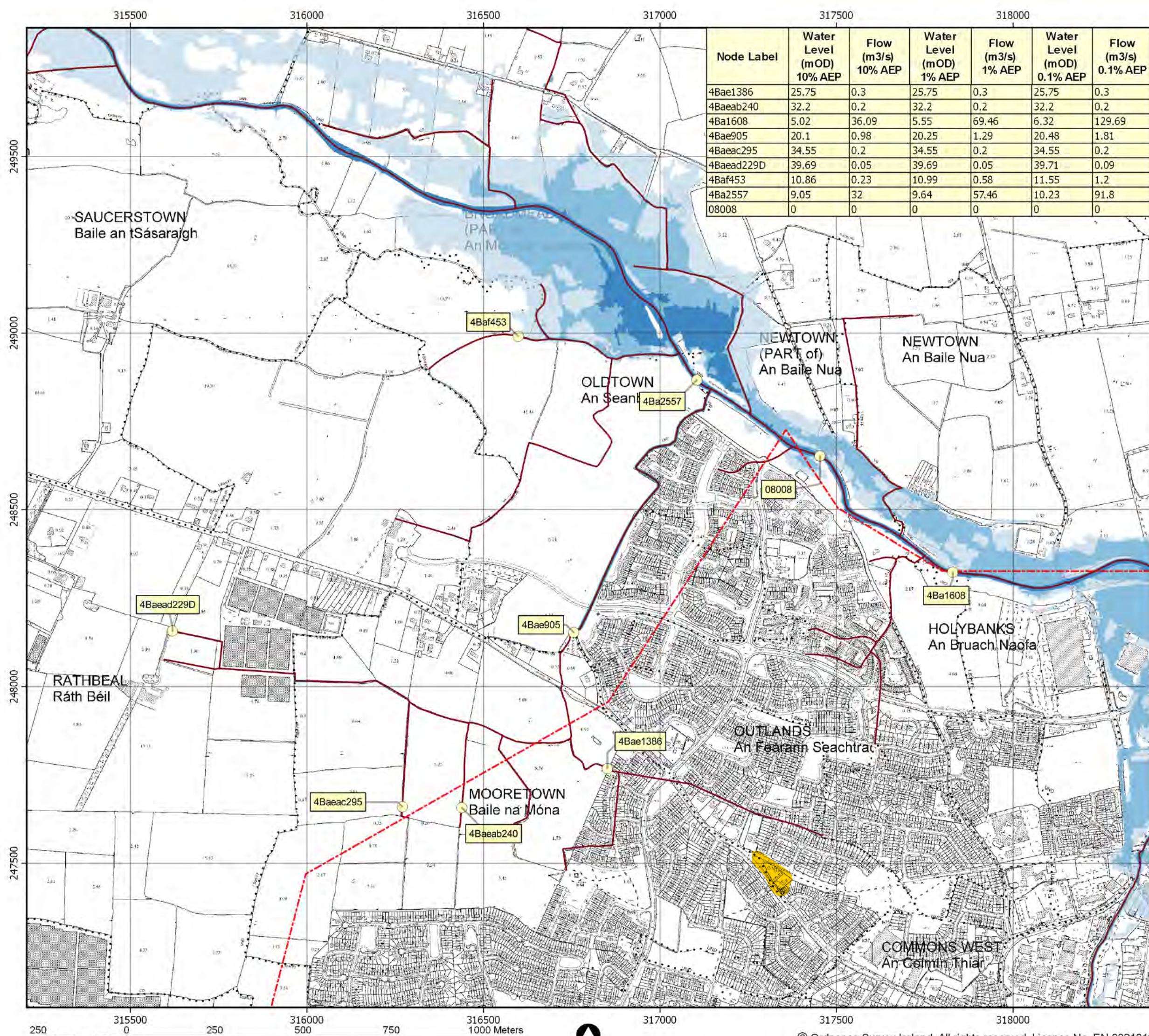
Inspections by Kavanagh Mansfield and Partners are carried out subject strictly to the following conditions unless otherwise expressly agreed in writing:

1. Initial inspections are non-intrusive, 'walkaround', preliminary assessments of structures. They are concerned with the strength, stability and durability of the basic structure of the building and they are carried out generally on the basis recommended in 'Surveys and Inspections of Buildings and Similar Structures' published by the Institution of Structural Engineers. They are *not* 'structural surveys' as that term is used by, for example, the Society of Chartered Surveyors; some aspects of non-structural elements/matters - such as electrical, drainage and other services, completions and finishes, doors and windows, water- and weather-tightness - may be noted in passing and commented on but are not dealt with comprehensively.
2. Initial inspections of structures are limited to noting and commenting on observed visible defects which in our opinion may prove to be symptomatic of significant inherent structural distress. No substantial opening-up to expose or uncover the structure is carried out; note in this respect that it is not possible to state that structural elements that are covered, unexposed or inaccessible are free from defects. A more detailed structural investigation and appraisal can be carried out on request.
3. Structural inspections do *not* deal with the following *inter alia*: the condition of timber and the presence or extent of fungal or insect infestation such as dry rot (a timber decay specialist's advice should be sought in relation to these); the presence or extent of asbestos (an asbestos specialist's advice should be sought in relation to these); the presence or extent of IAPS (invasive alien plant species) including Japanese knotweed; planning permission and other building control approvals; fire risk assessment; the possible presence of radon gas (the Radiological Protection Institute of Ireland will facilitate a radon survey for a small charge); legal rights of ownership (such as whether dividing/boundary walls are party walls or are owned by one person).
4. Any suggested remedial (or other) works in our inspection reports are indicative & subject to subsequent detailed design and specification.
5. No verification of any information or documentation supplied by others has been carried out by us.
6. Reports are strictly for the private and exclusive use of the commissioning client and, further, solely for the purpose for which originally commissioned. They may not be assigned to third parties. They shall not be used or relied upon by third parties.
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## Appendix A

**Copy of the OPW Flood Risk Assessment Map (FRAM)**



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

**Project:** FINGAL EAST MEATH FRAM STUDY

**Map:** Broad Meadow Model  
**FLUVIAL FLOOD EXTENT MAP**

Map Type:	EXTENT	
Source:	FLUVIAL	
Map Area:	HPW	
Scenario:	CURRENT	
Drawn by:	IH	Date: Sep - 2016
Checked by:	MC	Date: Sep - 2016
Approved by:	JM	Date: Sep - 2016
Map No.:	BRO/HPW/EXT/CURS/009	
Revision:	F0	
Map Scale:	1:10,000	
Plot Scale:	1:1 @ A3	