

# Strategic Flood Risk Assessment

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For

PROPOSED MIXED USE SCHEME AT GULISTAN DEPOT,  
RATHMINES

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## 1.0 Introduction + Context

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This report has been prepared in accordance with ‘The Planning System and Flood Risk Management Guidelines for Planning Authorities’ (2009), published by the Department of Environment, Heritage and Local Government (DoEHLG).

### 1.1 Proposed Development

It is proposed to facilitate a mixed use development on the Gulistan Depot lands for the purpose of the delivery of a primary care facility, older persons housing scheme, cost rental scheme, community facilities and public open space.

#### ***Guiding Principles for Development***

The main components of the Masterplan are arranged around and integrated within a new Civic Space as follows:

- a) A new primary Health Care Centre located on the northern part of the site, (gross floor area approx. 3,500 sq. m).
- b) A new Age Friendly housing scheme to the eastern side of the site adjacent to existing housing.
- c) A new Civic Space, approximately 1,500 sq. m in size.
- d) A new Cost Rental Scheme is proposed on the west side of the site, opposite the Age Friendly homes, across a new tree lined street.
- e) The Stone Building (250 sq. m) is to be repurposed so that it can accommodate a variety of uses e.g. craft shops, artists’ studios.
- f) A new Private Mews Development for premises on Rathmines Road. It should be noted that this will be a private development and is not part of this scheme.

No change to the land-use zoning to the lands is to result from the proposed Masterplan.

### 1.2 Purpose of the Proposed Masterplan

To ensure that the development of the subject lands occurs in a sustainable and coherent manner, a draft masterplan has been prepared for the site which complies with the guiding principles above. All planning applications for the site will be required to comply with the masterplan and the principles outlined above. Minor deviations will only be considered where the change supports the implementation of the principles and provides an improved solution.

The purpose of the draft Masterplan is to provide for the comprehensive regeneration of a former depot site to a mixed use scheme incorporating residential, community, health services and public open space.

### 1.2.1 Policy Context

The **National Planning Framework (NPF)** (Project Ireland 2040) states that at least 50% of all new homes for Dublin City and suburbs are required to be delivered within and adjoining its existing built-up footprint. To achieve this, the NPF identifies the reusing of large and small 'brownfield' land/infill sites, and underutilised lands at locations well served by existing and planned public transport. The NPF particularly highlights the need to focus on underutilised lands within the canals and the M50 ring. The proposed development of the subject site supports this policy position.

The **Regional Spatial and Economic Strategy (RSES)** for the Eastern and Midlands Region seeks the consolidation and re-intensification of infill, brownfield, and underutilised lands within Dublin City and its suburbs. 50% of all new homes within Dublin City and its suburbs are to be located in the existing built-up area. The RSES identifies a population target increase for Dublin City (DCC's administrative area) of circa 100,000 people by 2031. To facilitate this growth the RSES also includes a **Metropolitan Area Strategic Plan (MASP)** for Dublin. The MASP directs future growth to identified Strategic Development Areas located on existing and planned strategic transport corridors and anticipates future growth will also be accommodated on brownfield/infill development lands in the city. The draft Masterplan supports this policy position by making use of serviced land well connected to the city centre.

The **National Transport Authority's Transport Strategy for the Greater Dublin Area 2016-2035** provides a framework for developing a sustainable transport network. Augmenting the existing Luas Green Line, two key public transportation projects for Dublin City include:

- **Bus Connects** – enhancement of Dublin's bus network along with several identified Core Bus Corridors, including the Rathfarnham Core Bus Corridor which will serve Rathmines.
- **Metrolink** – proposed rail link from the Charlemont to Dublin Airport / Swords

The proposed masterplan supports and establishes a plan-led approach to maximising the development of the lands in line with significant State investment in the public transport infrastructure of the area and in line with national and regional planning policy.

### 1.2.2 Background

The Gulistan Depot lands have been identified as suitable for redevelopment, having regard to its strategic location adjacent to the city centre and being well located with respect to sustainable transport infrastructure. This area represents well-connected but underutilised brownfield lands within the built-up area of the City with the potential to allow for more varied and appropriate mixed uses.

Further, the Rathmines Local Action Area Plan (2009) contained a comprehensive strategic assessment of the entire Rathmines area, and recognised the Gulistan Depot as a key opportunity site for re-development.

The masterplan lands comprise a total of c. 1.13 ha. A Feasibility Study conducted for the site identified the capacity to accommodate approximately 90 Cost Rental homes, 66 Age-Friendly homes, a Primary Care Centre with approximately 3,500 sq. m of floor space, a community building c250 sq. m in size and a new civic plaza of approximately 1,500 sq. m in area. Further, it is envisaged that the redevelopment of the site will stimulate development of mews buildings at the rear of the privately owned properties to the west of the site that front Rathmines Road.

## 2.0 Study Area

### 2.1 Context for Masterplan

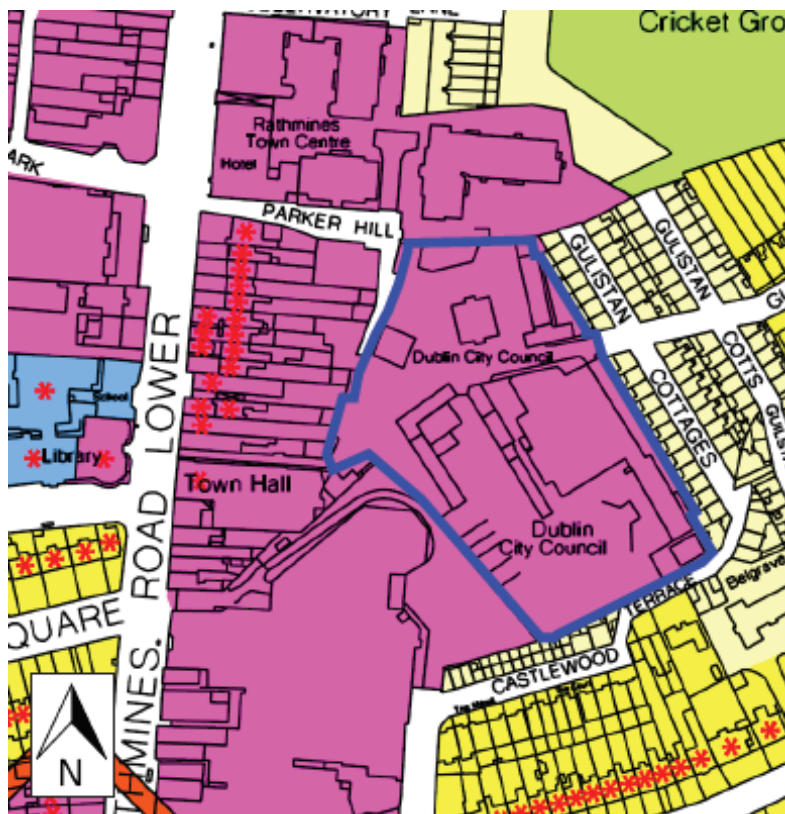
The c. 1.13 hectare land bank is situated to the immediate east of Rathmines village and is bounded by Parker Hill to the north, Gulistan Cottages to the east, Castlewood Terrace to the south and buildings on the Rathmines Road to the west. The lands border existing residential dwellings to the north, south and east and commercial buildings to the west. The Swan Shopping Centre is located immediately to the southwest.

The site comprises a former depot, a bring centre and a defunct ESB premises, acquired by Dublin City Council.

The site is zoned for Mixed Use Purposes (Z4) in the City Development Plan in order to enhance the role of Rathmines as a Key District Centre serving the wider Rathmines Area.

The site is well served by public transport, with pedestrian access to Rathmines Road and a vehicular entrance via Gulistan Terrace to Mountpleasant Avenue.

**Figure 1 Location Map**





**Figure 2 Site location relative to future high end scenarios for coastal flooding and rainfall flood extents**



Source: Floodinfo.ie

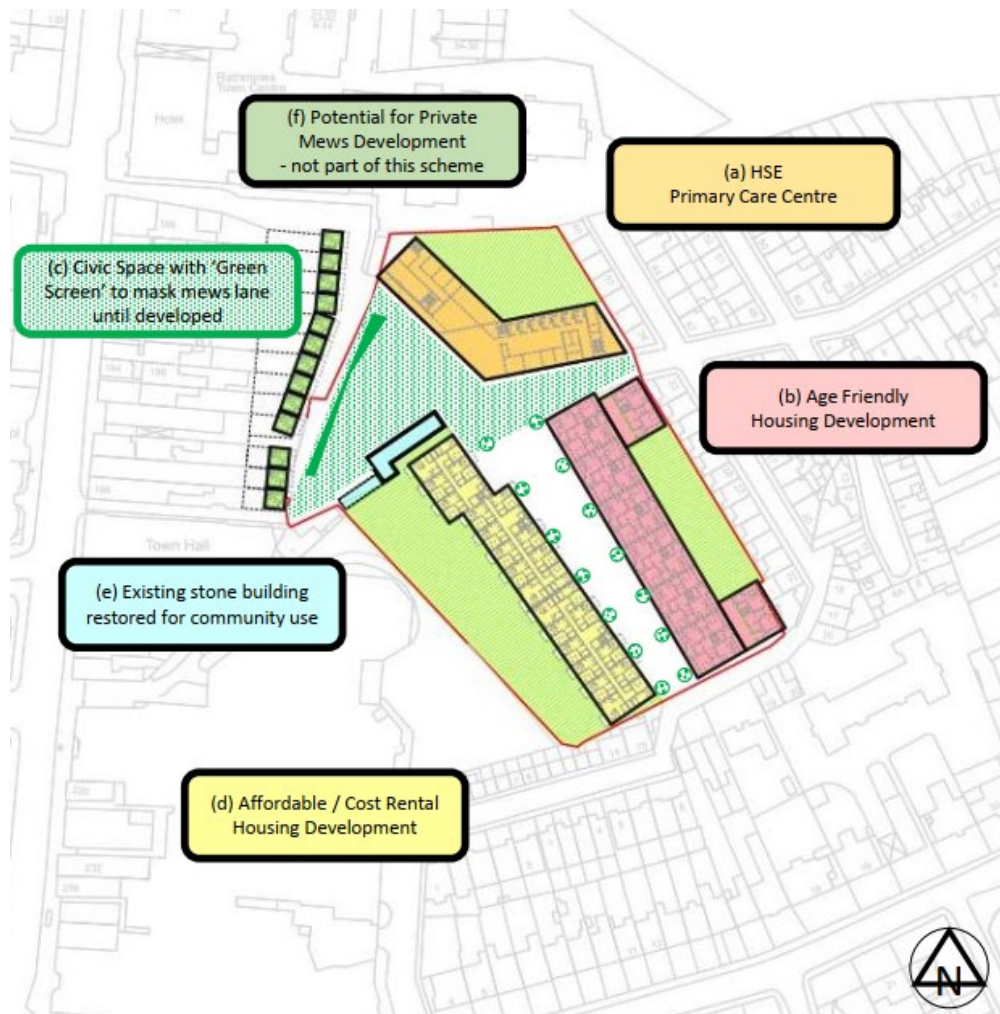
### 2.1.1 Masterplan Proposals

The main components of the Masterplan are arranged around and integrated within a new Civic Space as follows:

- a) A new primary Health Care Centre located on the northern part of the site, (gross floor area approx. 3,500m<sup>2</sup>).
- b) A new Age Friendly housing scheme to the eastern side of the site adjacent to existing housing.
- c) A new Civic Space, approximately 1,500m<sup>2</sup> in size.
- d) A new Cost Rental Scheme is proposed on the west side of the site, opposite the Age Friendly homes, across a new tree lined street.
- e) The Stone Building (250m<sup>2</sup>) is to be repurposed so that it can accommodate a variety of uses e.g. craft shops, artists' studios.

- f) A new Private Mews Development for premises on Rathmines Road. It should be noted that this proposal does not form part of the masterplan lands.

**Figure 3 Proposed Masterplan Layout**



## 2.2 Watercourses

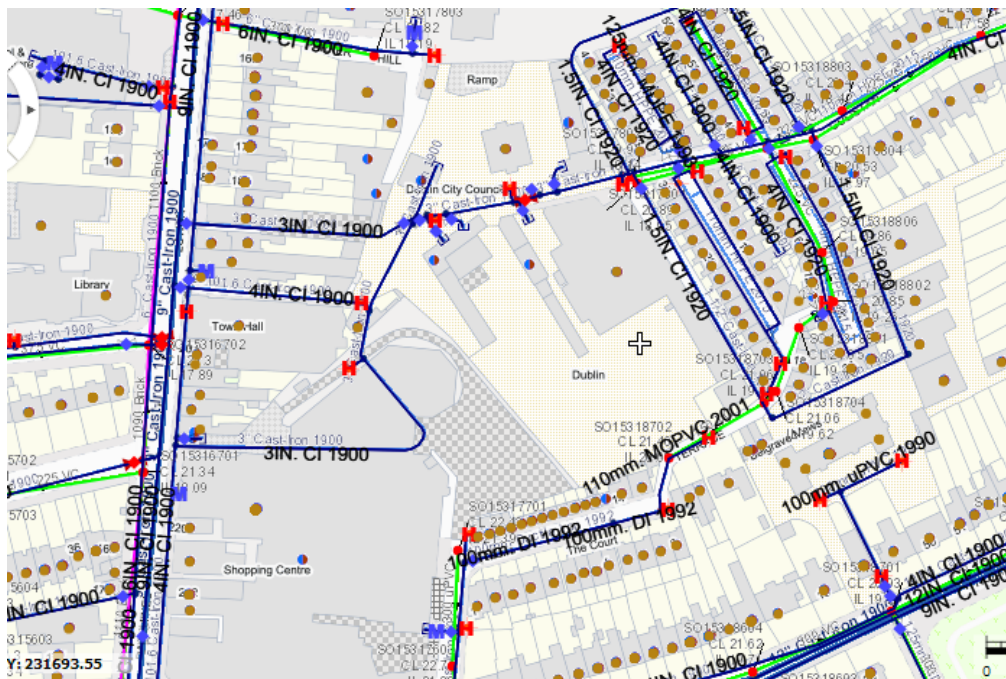
There are no watercourses in proximity to the subject site.

## 2.3 Existing Surface Water Infrastructure

The existing primary surface water infrastructure within the area is indicated in Figure 3 below.



Figure 4 Water Infrastructure Network



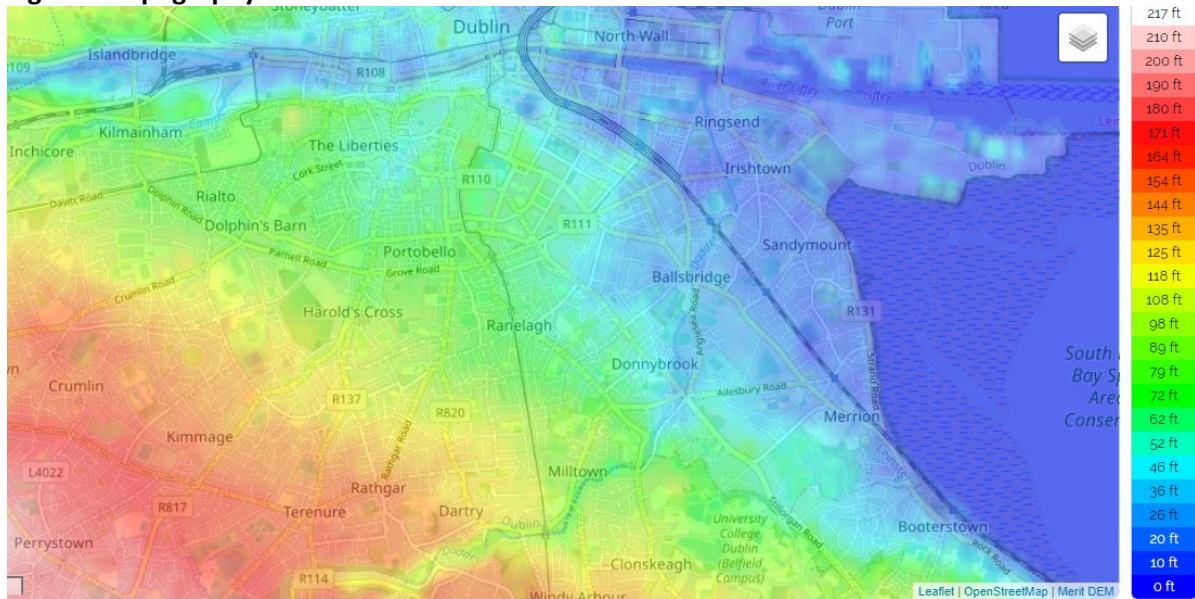
A network of surface water sewers feeds into the main strategic network surrounding the site. This network is well developed, however there is a lack of existing surface water infrastructure on the site. This will need to be addressed in terms of dealing with surface water runoff etc.

#### 2.4 Topography

Rathmines is similar in topography to the City Centre, with the land falling gradually towards the Liffey Valley and on to Dublin Bay, changing from c. 25m in Rathmines to c.10m in the Temple Bar area see Figure 4 below.



**Figure 5 Topography of Rathmines**

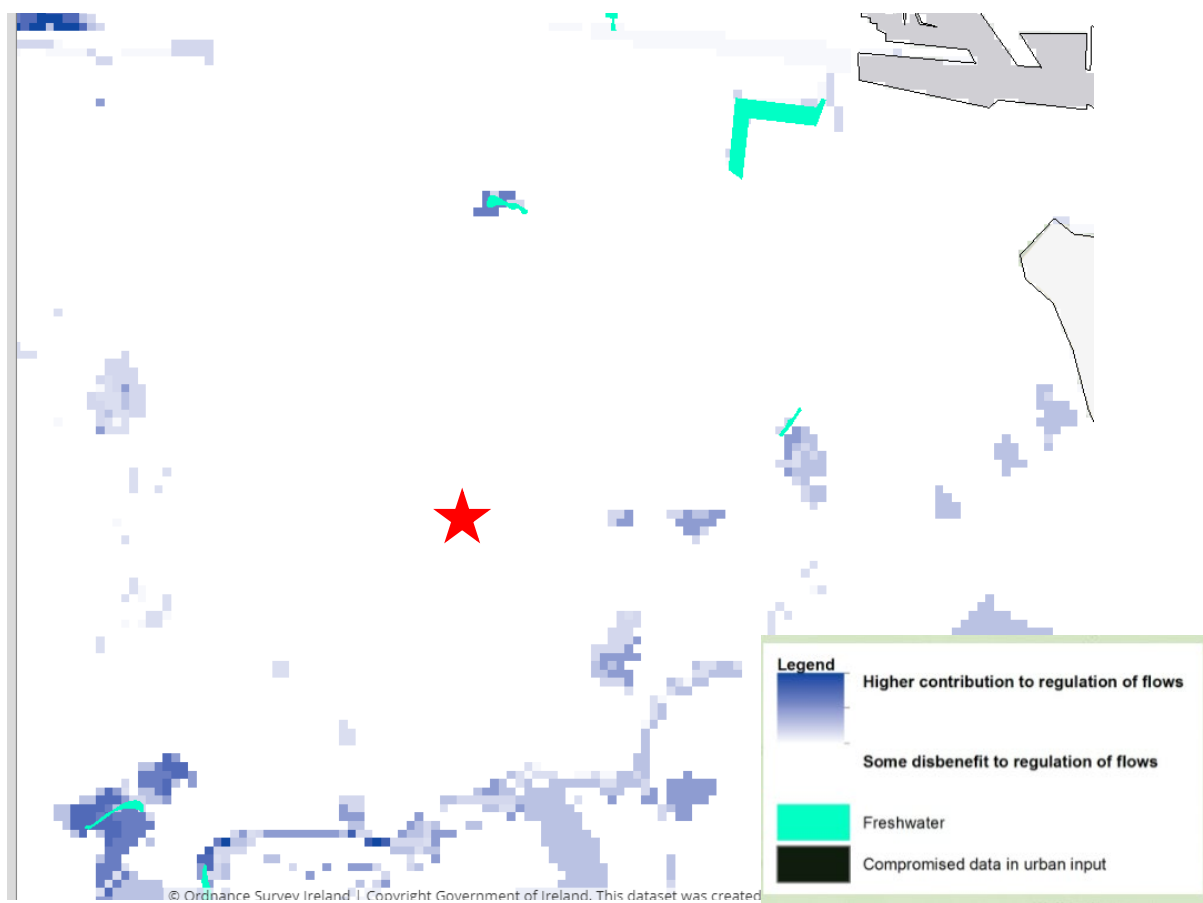


Source: <https://en-ie.topographic-map.com/maps/qb/Dublin/>

### 2.5 Water Attenuation

Linked to topography and also ground conditions is the rate at which water is retained within an area. As can be seen in Figure 5 below, Rathmines has in general a low water retention value, with limited opportunities for water to be held locally. Retaining water locally can greatly help to reduce flood and water pollution issues. The darker colours shown on the map represent areas that temporarily store water, slowing down the overland flow and therefore contribute to flood control. The lighter colours indicate areas where water is moving quickly through the environment contributing to flooding risk at the downstream parts of the catchment. All new developments within the City are required to demonstrate how they can reduce the water run-off from each site, preferably through the use of natural water retention measures and it is considered that this will need to be incorporated into any development of the site.

**Figure 6 Water Attenuation**



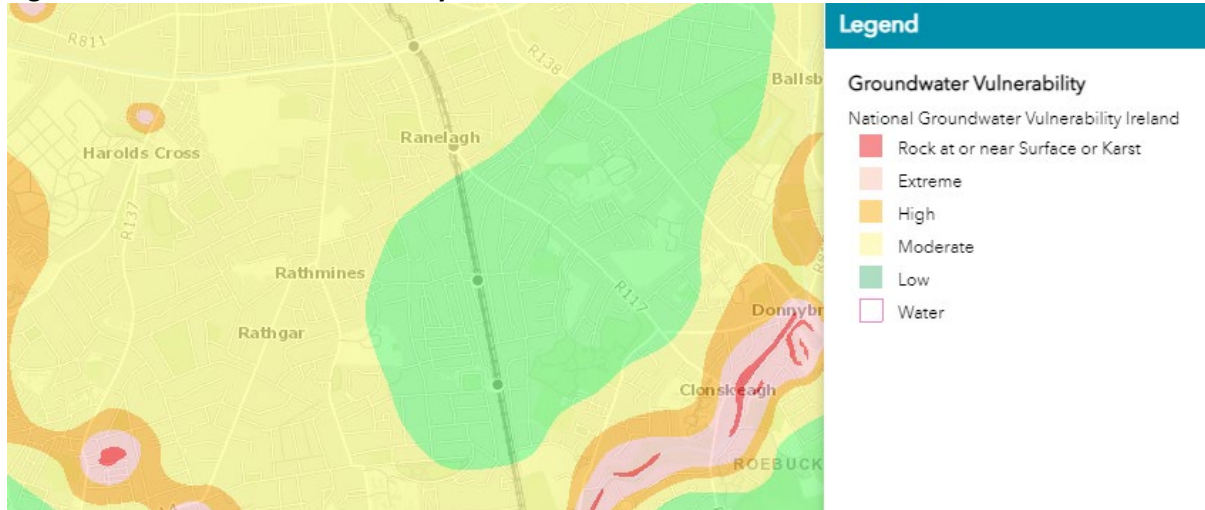
*Figure Source: National Parks and Wildlife Service (National Ecosystem and Ecosystem Services Mapping Pilot).*

### 2.6 Groundwater Vulnerability

Groundwater Vulnerability is a term used to represent the natural ground characteristics that determine the ease with which groundwater may be contaminated by human activities. It is based on the concept of whether water and contaminants can move within the subsurface materials (soil and subsoil) and get down to groundwater easily. The vulnerability category assigned to an area is thus based on the relative ease with which infiltrating water and potential contaminants may reach groundwater in a vertical or sub-vertical direction. As all groundwater is hydrologically connected to the land surface, it is the effectiveness of this connection that determines the relative vulnerability to contamination. Groundwater that readily and quickly receives water (and contaminants) from the land surface is considered to be more vulnerable than groundwater that receives water (and contaminants) more slowly, and consequently in lower quantities. Also, the slower the movement and the longer the pathway, the greater is the potential for attenuation of many contaminants.

In areas where water moves quickly or at times of flooding, then higher quantities of contaminants will have access to groundwater. The groundwater vulnerability map published by the Geological Survey of Ireland (GSI) and as shown below in Figure 6, shows that most of Rathmines has a moderate to low groundwater vulnerability. The masterplan area is shown to have moderate groundwater vulnerability. Development in this masterplan area will require a surface water management strategy.

**Figure 7 Ground Water Vulnerability**



Source: Geological Survey Ireland

### 3.0 The Planning System and Flood Risk Management

*The Planning System and Flood Risk Management: Guidelines for Planning Authorities* (the Guidelines), published in 2009, provides a framework for assessing flood risk in the planning process. This Section will outline the definition of risk in terms of its likelihood and consequences and will define the Flood Zones. It will then set out the justification test that is used as a planning tool when considering sites for development.

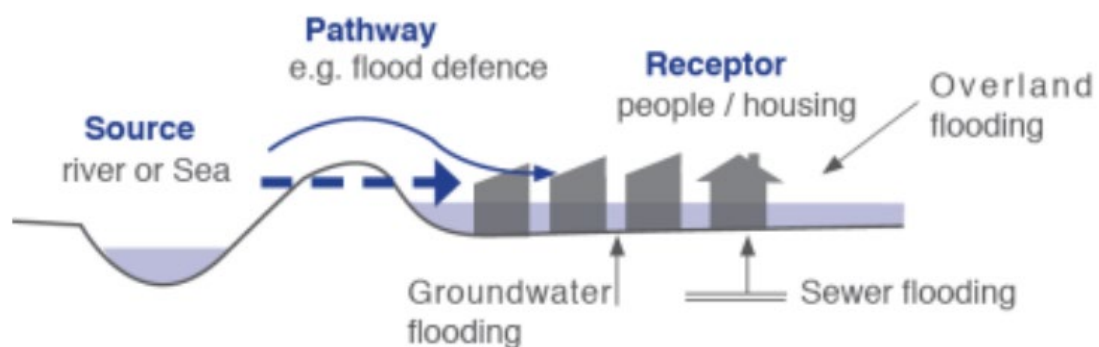
#### 3.1 Identification of Flood Risk

Flood risk is a combination of the likelihood of a flood event occurring and the potential consequences arising from that flood event. Flood risk can be expressed by the following relationship:

$$\text{Flood Risk} = \text{Probability of Flooding} \times \text{Consequences of Flooding}$$

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. The *source-pathway-receptor model* below illustrates this.

**Figure 8 Source-Pathway-Receptor Model**



Source: *The Planning System and Flood Risk Management: Guidelines for Planning Authorities* (2009)

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 the effectiveness of any proposed mitigation measures.

### 3.2 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 has a 1% chance of being equalled or exceeded in any given year. Annual Exceedance probability is the inverse of the return period as shown below.

#### Probability of Flooding

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

### 3.3 Consequences of Flooding

The consequences of flooding depend on the hazards caused by flooding (depth of water, speed of flow, rate of onset, duration, water quality) and the vulnerability of receptors (the type of development, nature, presence, and reliability of mitigation measures, etc.).

The Guidelines provide three vulnerability categories, based on the type of development, which are detailed in Table 3.1 of the Guidelines, and are summarised as follows:

- **Highly vulnerable:** including residential properties, essential infrastructure, and emergency service facilities.
- **Less vulnerable:** such as retail and commercial and local transport infrastructure.
- **Water compatible:** including open space, outdoor recreation, and associated essential infrastructure, such as changing rooms.

### 3.4 Definition of Flood Zones

The Guidelines use flood zones to indicate the likelihood of a flood event occurring. The zones indicate a high, moderate, or low risk of flooding occurring.

**It is important to note that the definition of flood zones is based on an undefended scenario and does not consider flood protection measures.**

Flood zones only indicate flooding from fluvial and tidal sources and **do not consider** other sources such as groundwater or pluvial sources.

Zone	Description
<b>Zone A</b> High Probability of Flooding	This zone defines areas with the highest risk of flooding from rivers (i.e. more than 1% probability or more than 1 in 100) and the coast (i.e. more than 0.5% probability or more than 1 in 200).
<b>Zone B</b> Moderate Probability of Flooding	This zone defines areas with a moderate risk of flooding from rivers (i.e. 0.1% to 1% probability or between 1 in 100 and 1 in 1000) and the coast (i.e. 0.1% to 0.5% probability or between 1 in 200 and 1 in 1000).
<b>Zone C</b> Low Probability of Flooding	This zone defines areas with a low risk of flooding from rivers and the coast (i.e. less than 0.1% probability or less than 1 in 1000).

### 3.5 Sequential Approach & Justification Test

The Guidelines outline a sequential approach to managing flood risk in the planning process. The principles of the sequential approach are illustrated by the following diagram.



**Figure 9 Sequential Approach Principles in Flood Risk Management**



Source: *The Planning System and Flood Risk Management: Guidelines for Planning Authorities* (2009)

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.

The following table illustrates the matrix of vulnerability as per the Guidelines. The SFRA aims to guide development zonings to those which are 'appropriate' and thereby avoid the need to apply the Justification Test.

**Flood Zone Matrix of Vulnerability**

	Flood Zone A	Flood Zone B	Flood Zone C
<b>Highly Vulnerable Development</b>	Justification Test	Justification Test	Appropriate
<b>Less Vulnerable Development</b>	Justification Test	Appropriate	Appropriate
<b>Water-Compatible Development</b>	Appropriate	Appropriate	Appropriate

Source: *The Planning System and Flood Risk Management: Guidelines for Planning Authorities* (2009)

**The lands subject to this masterplan are situated within Flood Zone C. Having regard to the above and the SFRA that was prepared for the Dublin City Development Plan 2016-2022 (the Development Plan), the proposed redevelopment is considered appropriate and therefore a justification test is not required.**

## 4.0 Data Collection

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### 4.1 Overview

There are several sources of flood data available for the study area.

### 4.2 National PFRA Study

The Preliminary Flood Risk Assessment (PFRA) is a national screening exercise that was undertaken by the OPW to identify areas at potential flood risk. The PFRA was a requirement of the EU Floods Directive and this work informed the more detailed Catchment Flood Risk Assessment and Management (CFRAM) studies. As part of the PFRA study, maps of the country were produced showing the indicative fluvial, coastal, and pluvial, and groundwater flood extents.

The PFRA fluvial maps have been superseded by the detailed Eastern CFRAM (Catchment Flood Risk Assessment and Management).

### 4.3 Eastern CFRAM Study

The National CFRAM study is a more detailed FRA for the key flood risk areas (AFA's) identified in the PFRA. The subject site is covered by the Eastern CFRAM study area. The CFRAM Studies generated several outputs including:

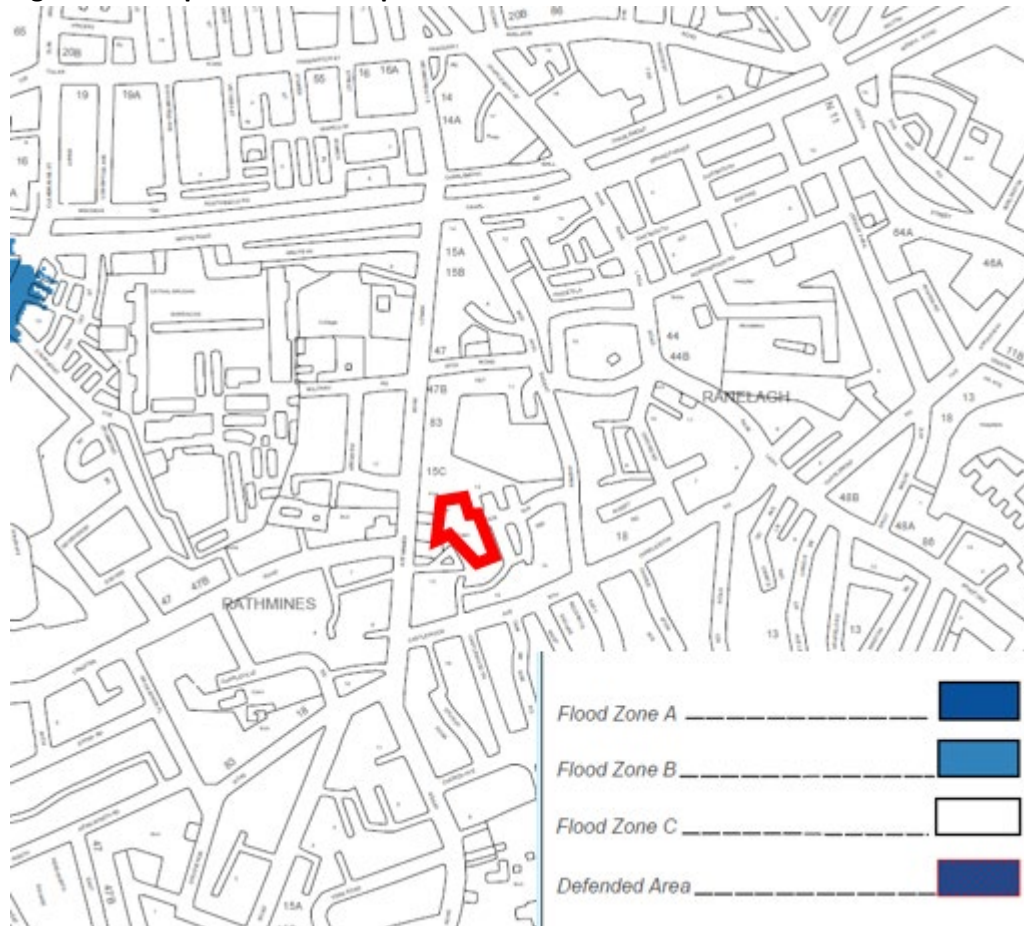
- Flood maps indicating modelled flood extents and flood zones for a range of flood events of annual exceedance probability (AEP).
- Flood Risk Management Plans (FRMPs) to manage flood risk within the relevant river catchment.

### 4.4 Dublin City Development Plan 2016 – 2022: Strategic Flood Risk Assessment Volume 7

A Strategic Flood Risk Assessment (SFRA) was prepared as part of the Development Plan. The SFRA informed the strategic land use planning decisions by providing an assessment of all flood risks within Dublin City. The SFRA contains inter-alia, a Composite Flood Map, flood management policies and objectives, and justification Tests. The SFRA was based on historical information such as floodmaps.ie (as updated by [www.floodinfo.ie](http://www.floodinfo.ie)) and predictive flood maps sourced from the CFRAM and FloodResilientCity pluvial programmes.

According to the Composite Flood Map for Dublin City, the subject lands proposed for redevelopment are within Flood Zone C.

**Figure 10 Composite Flood Map**



Source: Strategic Flood Risk Assessment (SFRA), Volume 7, Appendix 5, Dublin City Development Plan 2016-2022

#### 4.5 Sources of Flooding

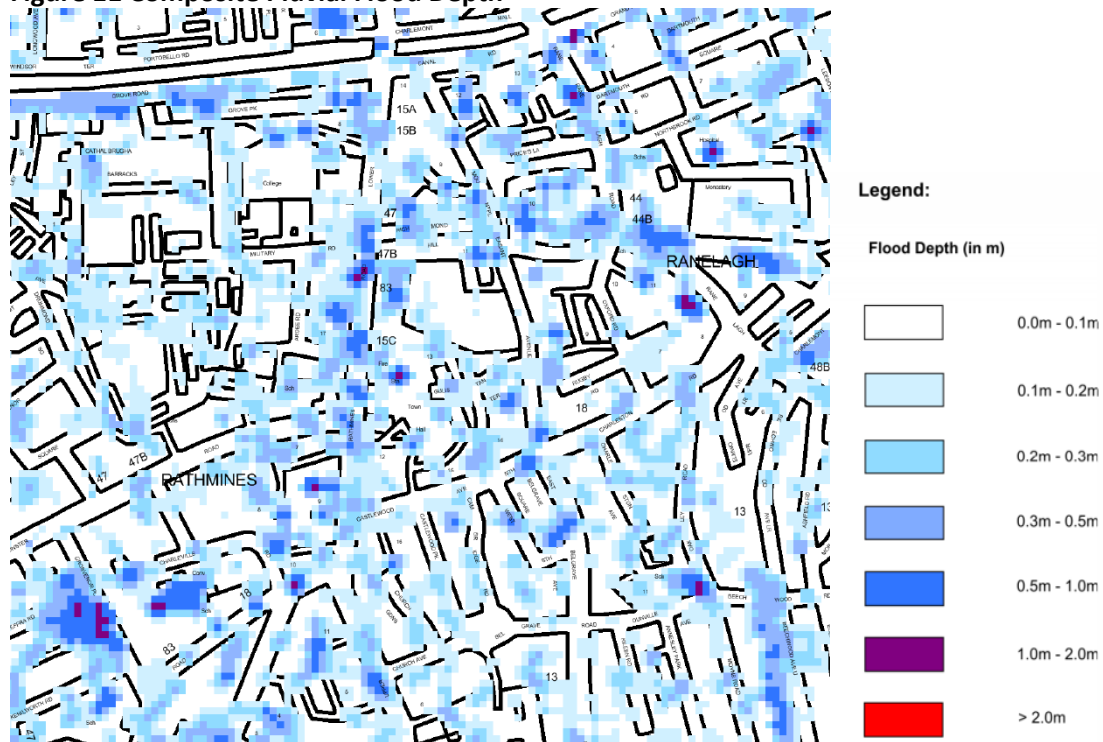
A review of the historical event data and predictive flood information has not highlighted any sources of potential flood risk to the area.

##### 4.5.1 Surface Water / Pluvial Flood Risk

Pluvial Flooding results when heavy, often sudden rainfall, causes flooding before it can infiltrate the ground, or enter a natural or man-made drainage system or a watercourse or a conveyance system (e.g. canal) because the system is already full to capacity. Pluvial flooding is associated with storm (surface) water flooding, which is a combination of true pluvial flooding, sewer flooding (due to heavy rainfall), groundwater flooding, and flooding from urban watercourses.

Extracts from the Development Plan Strategic Flood Risk Assessment for pluvial flooding in the study area are illustrated below. The majority lands subject to the masterplan indicate a low pluvial flood hazard, with a small area showing a moderate/significant risk concentrated to the north of the site. It is important to note that this could change if this site is developed.

**Figure 11 Composite Pluvial Flood Depth**



**Type 1 Pluvial Flood Depth Map (1% AEP Event – 3 Hr Duration Model), DCDP 2016**

**Figure 12 Pluvial Flood Hazard**



**Type 1 Pluvial Flood Hazard Map (1% AEP Event – 3 Hr Duration Model), DCDP 2016**

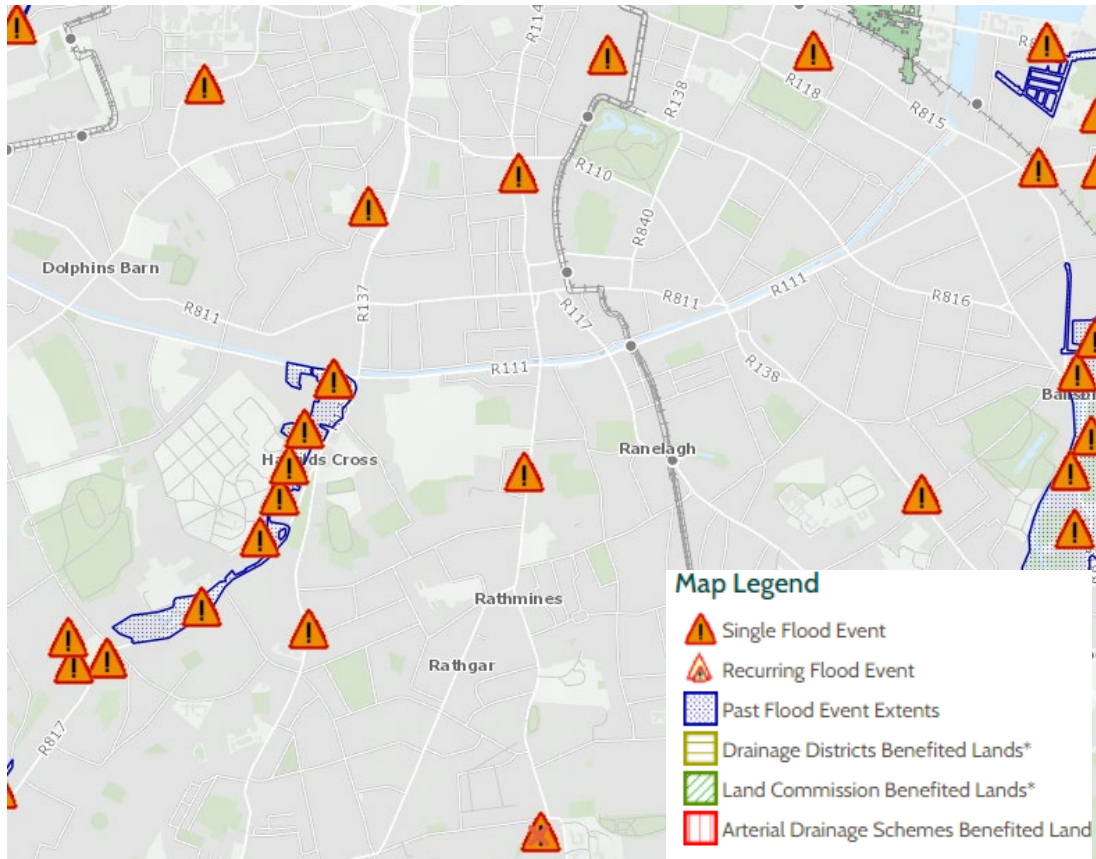
#### 4.5.2 Fluvial or river flooding

Due to the topography and the fast nature at which water flows through the area, the majority of flood events in this area happen within the immediate vicinity of the Dodder and Poddle Rivers (a



signifiacnt distance from the subject site), see information from the OPW Flood maps below. The one exception is a flood event dating from 1963 on the Rathmines Road Lower, since when a number of flood defence assets were put in place.

**Figure 13 Flood Events**



Source: OPW website

#### 4.6 Climate Change

The Planning System and Flood Risk Management guidelines recommend that a precautionary approach to climate change is adopted due to the level of uncertainty involved in the potential effects. Specific advice on the expected impacts of climate change and the allowances to be provided for future flood risk management in Ireland is given in the OPW guidance. This guidance considers two climate change scenarios. These include the Mid-Range Future Scenario (MRFS) and the High-End Future Scenario (HEFS). The MRFS is intended to represent a "likely" future scenario based on the wide range of future predictions available. While the HEFS represents a more "extreme" future scenario at the upper boundaries of future projections.

The OPW recommends the following allowances for climate change, as illustrated below.



## Allowances for Future Scenarios

Parameter	MRFS	HEFS
Extreme Rainfall Depths	+ 20%	+ 30%
Peak Flood Flows	+ 20%	+ 30%
Mean Sea Level Rise	+ 500 mm	+ 1000 mm
Land Movement	- 0.5 mm / year <sup>1</sup>	- 0.5 mm / year <sup>1</sup>
Urbanisation	No General Allowance - Review on Case-by-Case Basis	No General Allowance - Review on Case-by-Case Basis
Forestation	- 1/6 Tp <sup>2</sup>	- 1/3 Tp <sup>2</sup> + 10% SPR <sup>3</sup>

Note 1: Applicable to the southern part of the country only (Dublin – Galway and south of this)

Note 2: Reduction in the time to peak (Tp) to allow for potential accelerated runoff that may arise as a result of drainage of afforested land

Note 3: Add 10% to the Standard Percentage Runoff (SPR) rate: This allows for temporary increased runoff rates that may arise following felling of forestry.

Source: OPW (September 2019) *Flood Risk Management Climate Change Sectoral Adaptation Plan*

## 5.0 Flood Risk Management

### 5.1 Overview

Based on a high-level assessment of the information outlined in the preceding sections, several constraints have been highlighted and can be summarised as follows:

1. The existing surface water drainage infrastructure at the subject site could be susceptible to increased pluvial flooding unless the management of new development is carefully managed sustainably through the use of SuDS.
2. The subject site is proposed for redevelopment and will require new surface water sewer infrastructure separating surface water runoff from the combined sewer system. An opportunity exists to incorporate green infrastructure and surface water management into the development at an early stage.
3. Any future development must take cognisance of the impact on downstream receiving watercourses and groundwater, requiring the implementation of an appropriate SuDS treatment measures.
4. Climate change which is estimated to add between 20% and 30% to design rainfall flood events had to be taken into account in the surface water management of all future proposed developments.

### 5.2 Recommendations for Managing Flood Risk

The Guidelines recommend a sequential approach to spatial planning, promoting avoidance rather than justification and subsequent mitigation of risk. As identified, the lands subject to this proposed variation are situated within **flood zone C**, and thus have a low risk associated with fluvial flooding and therefore, the justification test is not required. Having regard to the aim to transform this underutilised land bank into

a sustainable, mixed-use community, there is an opportunity to manage surface water, through green infrastructure/SUDS measures.

### 5.2.1 Recommended Objectives

No.	Objectives
1	Ensure that the future development of the lands is in accordance with the key principles of the <i>Planning System and Flood Risk Management Guidelines</i> .
2	A site-specific Flood Risk Assessment shall accompany all proposed developments at the planning application stage.

### 5.3 Recommendations for Managing Surface Water

The management of surface water within the subject lands should be such that there is no increased risk of flooding downstream, due to increased surface water generated by any proposed development. Additionally, the management of surface water would have to adhere to the requirements of the Greater Dublin Strategic Drainage Study (GSDSDS). As such a Surface Water Management Strategy should be prepared for the subject site, to ensure that any future development is sustainable and introduces best practice in terms of SuDS and Green Infrastructure.

#### 5.3.1 Recommended Objectives

No.	Objectives
1	All surface water on the subject lands shall be managed utilising the SuDS Treatment Train.
2	A Green Infrastructure Strategy for the site lands shall be required in planning applications for the site.
3	SuDS features shall be incorporated into the public realm and street network and within public open spaces.
4	Ensure that the requirements of addressing climate change are incorporated into the surface water management of future proposed developments.