Dún Laoghaire-Rathdown County Council

HOUSING DELIVERY ACTION PLAN 2022 – 2026

LEHAUNSTOWN LAND, CHERRYWOOD SDZ

PRELIMINARY FLOOD RISK ASSESSMENT

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Document information

Project Name	Residential Project for Social Housing Programmes at Lehaunstown Land in Cherrywood SDZ
Document Name	Preliminary Flood Risk Assessment
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Lehaunstown Land

FLOOD RISK ASSESSMENT

Contents

1 Executive Summary

The subject of this report is a preliminary flood risk assessment to accompany the planning application made under the Planning Act, Section 179A for the land at Lehaunstown owned by Dún Laoghaire-Rathdown County Council (DLRCC). A more detailed flood risk assessment would normally be carried out if deemed necessary by the conclusions of this report. The land development proposes the construction of approximately 126 dwelling units, of which 108 apartments and 18 houses. The lead multidisciplinary consultant appointed for the project planning phase is ABK Architects Pty Ltd.

This flood risk assessment was carried out in accordance with guidelines outlined in the Greater Dublin Strategic Drainage Study and OPW publication "*The Planning System and Flood Risk Assessment Guidelines for Planning Authorities*". The stages involved in this assessment of flood risk comprised Stage 1: Flood Risk Identification, and Stage 2: Initial Flood Risk Assessment.

The land is composed of two sections, with differently zoned. One, on the higher land, found on the west side, is zoned Residential. The other one, on the low land and tangential to the Cabinteely Stream river, found on the east side, is zoned Green Infrastructure.

Only on the Residential side of the land there are constructions proposed under this project. This side of the site is identified in the DLRCC County Development Plan and OPW Flood Maps as 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 flooding). The proposed development is therefore deemed '*Appropriate*' in accordance with the guidelines of the OPW's publication.

On the Green Infrastructure side of the land there will be no constructions, but only items associated with outdoor furniture. This site is identified in the DLRCC County Development Plan and OPW Flood Maps as a combination of zones A, B and C. Therefore is not appropriate for habitable constructions.

This report concentrates on the Residential-zoned side of the Lehaunstown land.

The flood risks from coastal, fluvial, pluvial and groundwater flooding were considered.

The site lies far away (2.2 km) and at high altitude (23.2 m) from the Irish Sea, or tributaries affected by tides.

The residential site lies completely outside the floodplain of the 0.1% AEP tidal flood event and the 0.1% AEP fluvial flood area. The site was assessed to consider the effect of flooding to the future. Even using an increase in rainfall of 20% and sea level rise of 500mm, the site was found to lie outside the mid-range future flood areas for coastal and fluvial flooding.

The only notable risk associated with the proposed development is deemed to be from pluvial flooding. Pluvial flood maps for the proposed site do not indicate a flood hazard. However, it is recommended that the design is cognisant of site topography and managing surface water which may accumulate on site. The development shall incorporate Sustainable Drainage Systems (SuDS) in order to reduce the risks associated with Pluvial flooding.

2 Location

A residential project is proposed by the Housing Department of DLRCC on a land at Lehaunstown, on the north east side of Cherrywood SDZ. The total area of the land is approximately 3.6 ha. The west side of the land, about 2 ha, is zoned Res 2 – residential, while the east side is zoned Green Infrastructure. The location is like below.

The land has never been constructed upon, and contains overgrown vegetation like grass and similar, and hedges and trees on its borders. On the east side is bordered by Cabinteely River.

Figure 1 – Site Location and Borders of the Land. Also shown a river on the east border

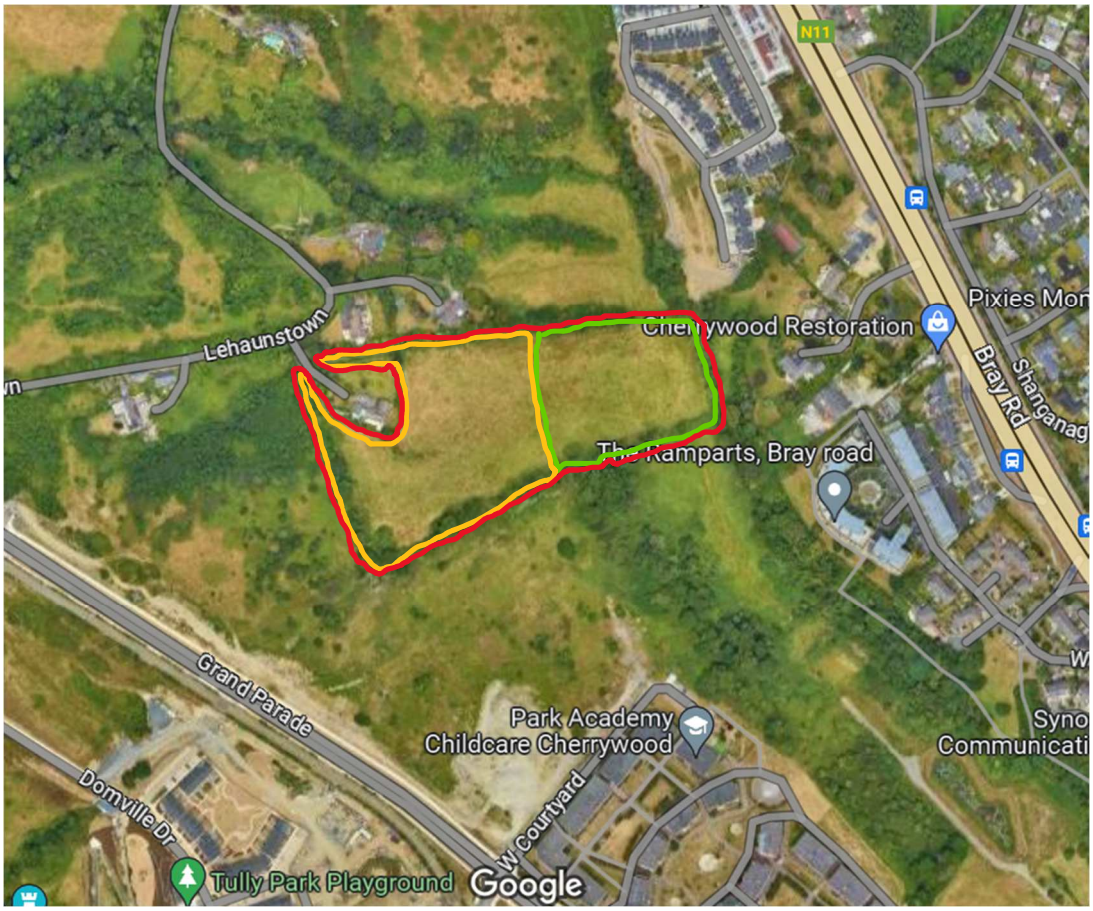


Figure 2 – Aerial view . .

Within the light brown line is the Res 2- residentially zoned land; within the green line is the Green Infrastructure section of the land. The red line shows the total area of the site for the planning application, and was not replicated in other drawings for visibility reasons.

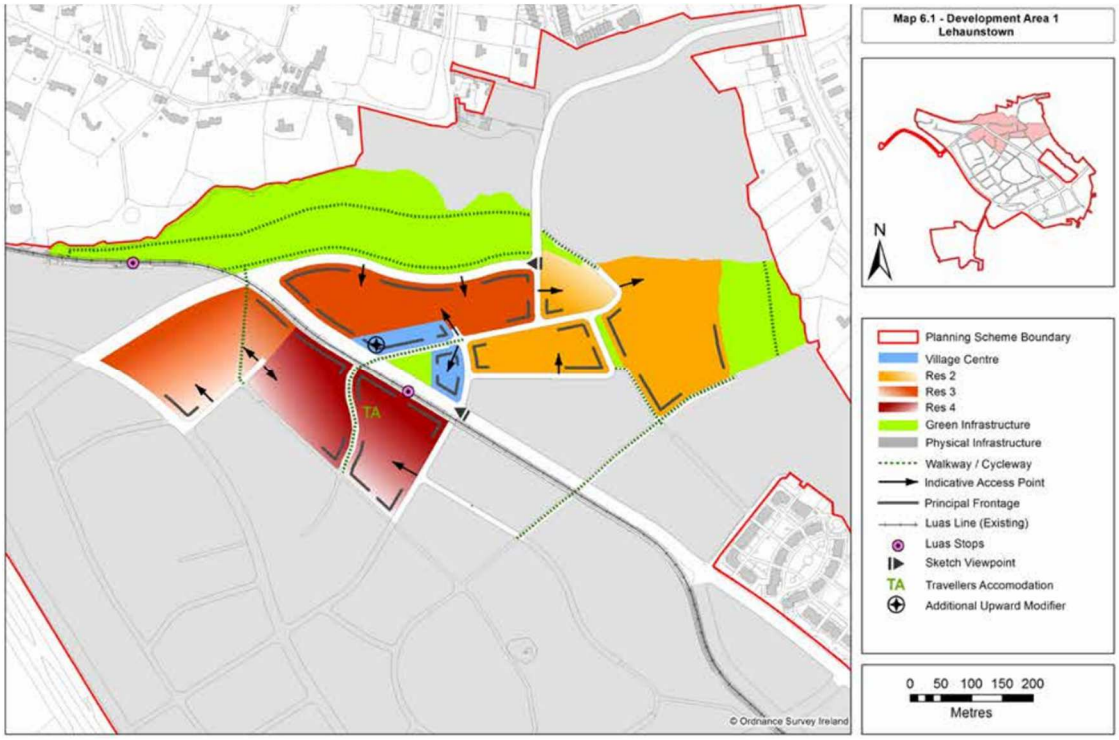


Figure 3 — Page 3 of Chapter 6 – Development Areas, of Cherrywood SDZ Planning Scheme, updated April 2021 – showing the land divided in two sites, one, on the west side, zoned Residential (shaded in light brown), and another one, on the east side, zoned Green Infrastructure (shaded in green).

3 Preliminary Flood Risk Assessment

3.1 Purpose of this report

This initial flood risk assessment has been prepared to accompany the Planning Application to be made under the Section 179A of the Planning Act.

3.2 Introduction

This flood risk assessment is carried out in accordance with guidelines outlined in the Greater Dublin Strategic Drainage Study and OPW publication "*The Planning System and Flood Risk Assessment Guidelines for Planning Authorities*". The stages involved in the assessment of flood risk are listed in that publication as follows:

Stage 1: Flood Risk Identification

Stage 2: Initial Flood Risk Assessment

Stage 3: Detailed Flood Risk Assessment

The OPW publication also outlines a Sequential Approach for determining whether a particular development is appropriate for a specified location in terms of flood risk. The categorization of the subject site in terms of the OPW's sequential approach is further outlined below.

This report covers Stages 1 and 2.

3.3 Flood Risk Identification

As outlined in the OPW publication, new developments are divided into three categories which are as follows:

- Highly Vulnerable Development
- Less Vulnerable Development
- Water-compatible Development

The proposed development comes under the heading of Highly Vulnerable Development - "*Dwelling houses, student halls of residence and hostels*".

Geographical areas are similarly divided into three categories, based on their risk of river and tidal flooding. The three categories are as follows:

- 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 flooding).
- 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 year and 0.5% 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% or 1 in 1000 for both river and coastal flooding i.e. all areas which are not within zone A or B).

The DLRCC Strategic Flood Risk Assessment (SFRA) was developed as part of the DLRCC County Development Plan 2022-2028. The SFRA provides an area-wide assessment of all types of

significant flood risk to inform strategic land use planning decisions. As part of the SFRA flood zone maps were incorporated in the County Development Plan. It can be seen from Figure 4 below (read in conjunction with Figures 1, 2 and 3) that the proposed development site lies outside of the Flood Zones A and B. The probability of flooding from Tidal or Fluvial sources is therefore very low.

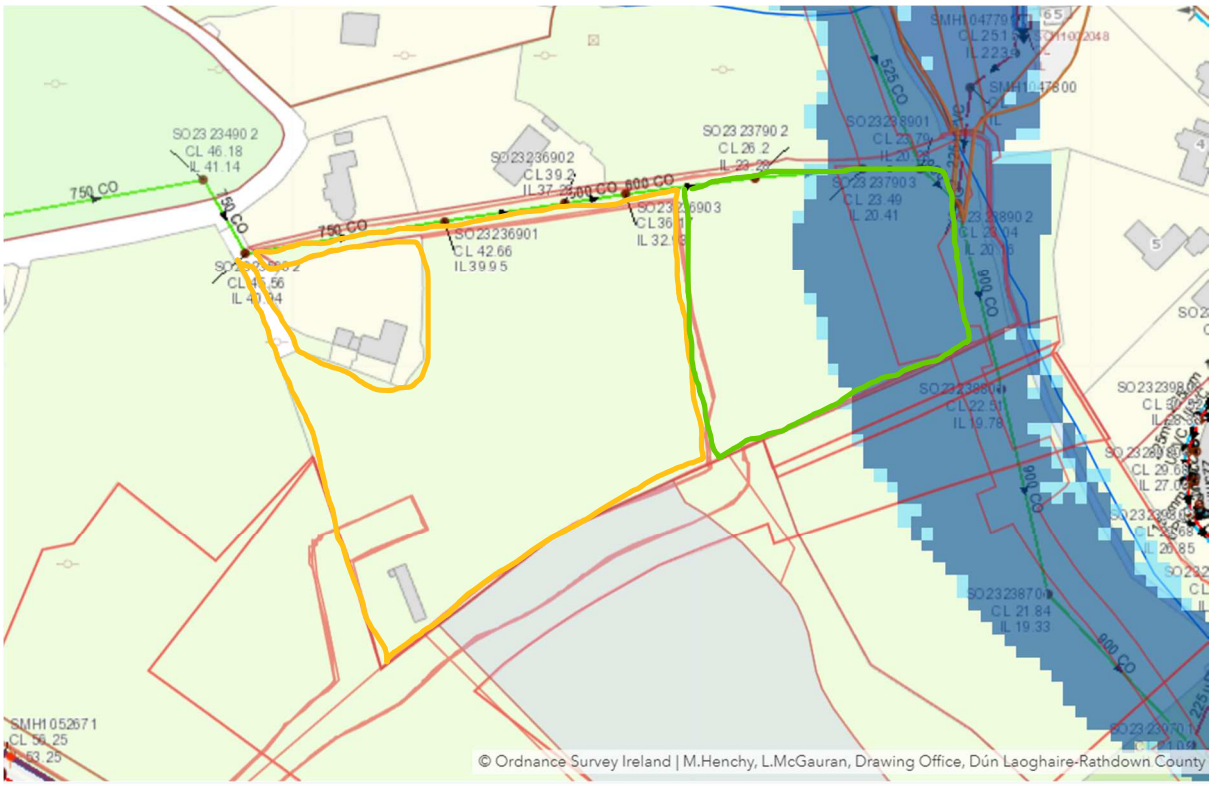


Figure 4 – from DLRCC' own Drainage Planning maps, showing the Flood Zones and also a bordering combined sewer
https://map.dlrcoco.ie/portal/home/webmap/viewer.html?webmap=70192b0c6ce44920ba2f0f38e382bcce&extent

Within the light brown line is the Res 2- residentially zoned land; within the green line is the Green Infrastructure. (The red lines to be ignored, they are previous planning applications.)

The matrix below, which is an extract from the OPW document, indicates whether a particular development is deemed 'Appropriate' for a geographical location.

	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

Figure 5 – Matrix of vulnerability versus flood zone

In accordance with the flood zone definitions outlined above, the subject site is located in Flood Zone C. Hence, the proposed development is deemed '*Appropriate*' in accordance with the guidelines of the OPW's publication.

The initial source considered is the OPW Flood Hazard Mapping service, which indicates historical flooding around the country. The OPW map report for this area (Figure 4) does not identify any locally occurring flood events in recent history. The nearest historical flooding is recorded very near to the river, where the site is zoned Green Infrastructure and no construction is proposed.

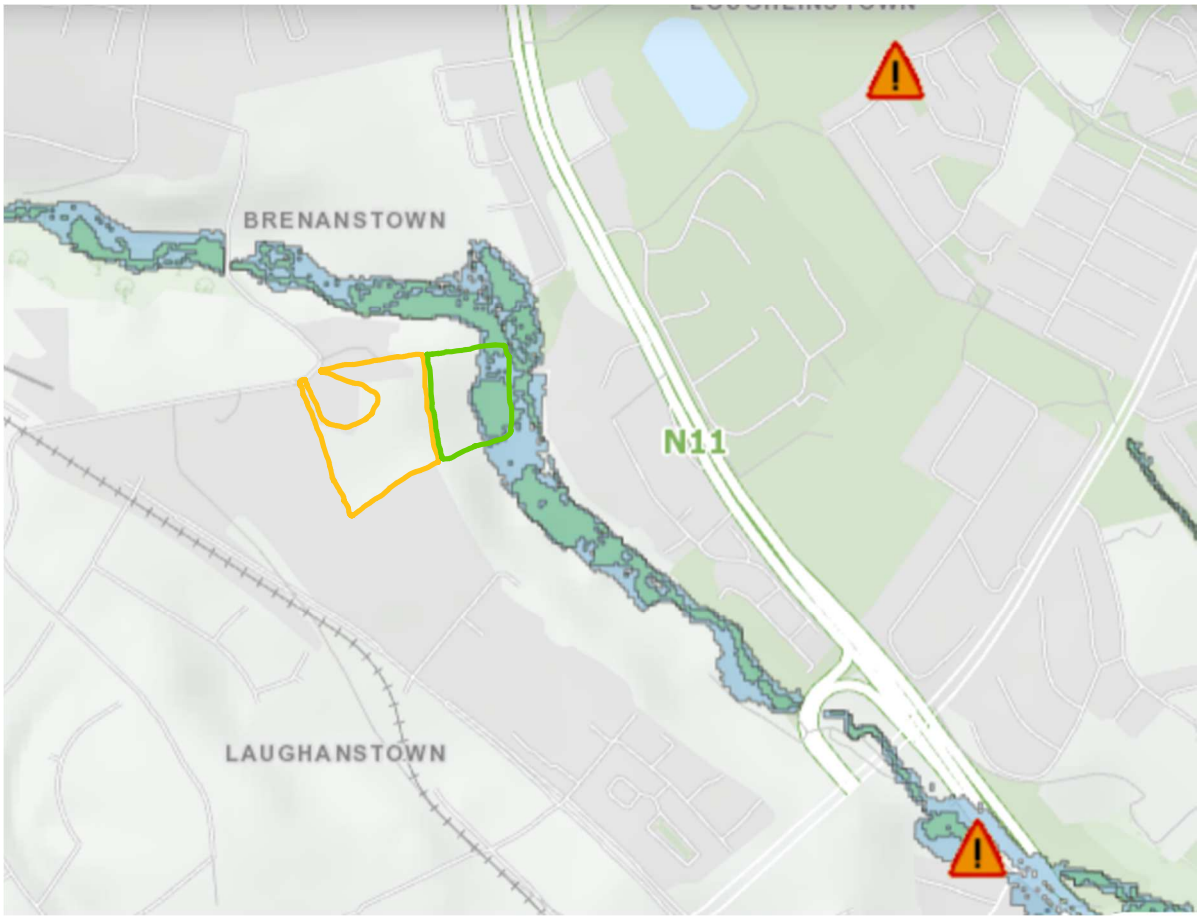


Figure 6 – Historical Flooding Map – https://www.floodinfo.ie/map/floodmaps/
Within the light brown line is the Res 2- residentially zoned land; within the green line is the Green Infrastructure.
As the above map shows, Cabinteely River is the only river in the proximity of the land. All Historic Flood Events recorded are shown on the map above.

There are several possible sources of flooding which must be considered for any flood risk assessment as indicated in the following table:

Source	Pathway	Receptor	Likelihood	Consequence	Risk
Tidal	Overtop Breach	People Property	Extremely unlikely	Very high	Low
Fluvial	Overtop Breach	People Property	Extremely unlikely	Very high	Low
Pluvial Surface water	Overflow Blockage	People Property	Possible	High	Medium
Groundwater	Rising groundwater levels	People Property	Unlikely	Low	Low

Figure 7 – Risk assessment

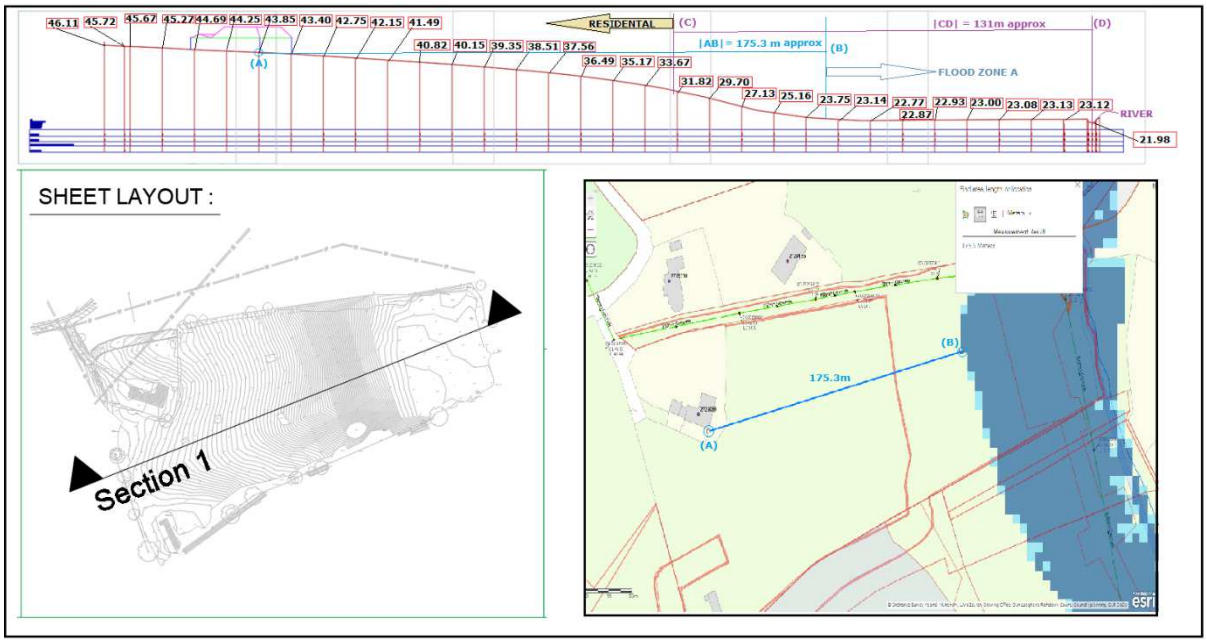


Figure 8 – The topography of the site and the relation to Flood Map

Figure 8 above shows that:

- the riverbed at section 1 is approximately at level 22.0 m AOD, and the bottom of the riverbank is 22.5 m to 22.2 m AOD
- the Flood Zone A extends approximately up to 23.5 m AOD
- the Flood Zone B extends approximately up to 23.5 m AOD
- the Residential-zones (west) side of the land starts at approximately 32.3 m AOD.

Tidal

The substantive land is at over 2,2 km from Irish Sea, and it is elevated to 23.2 m AOD at its lowest side. The Eastern CFRAM map shows no tidal flood occurrence at this distance or altitude. The subject site is outside the active functional floodplain of the 0.1% AEP tidal flood even.

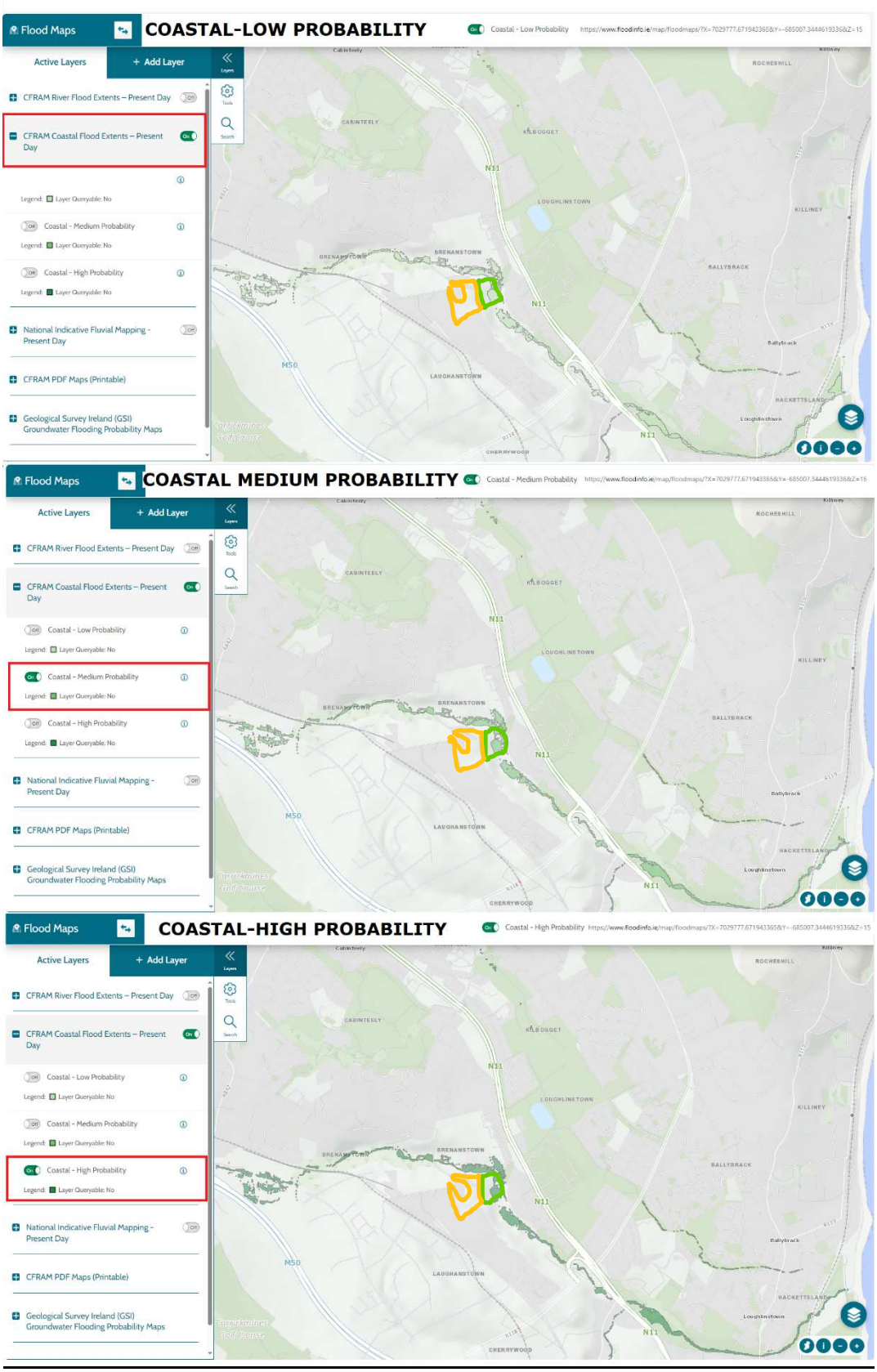


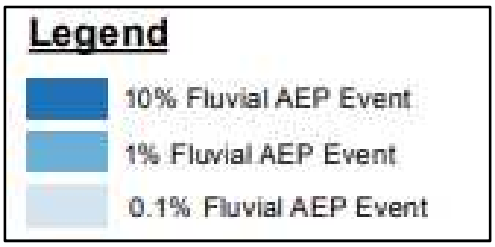
Figure 9 – Coastal Flood Maps

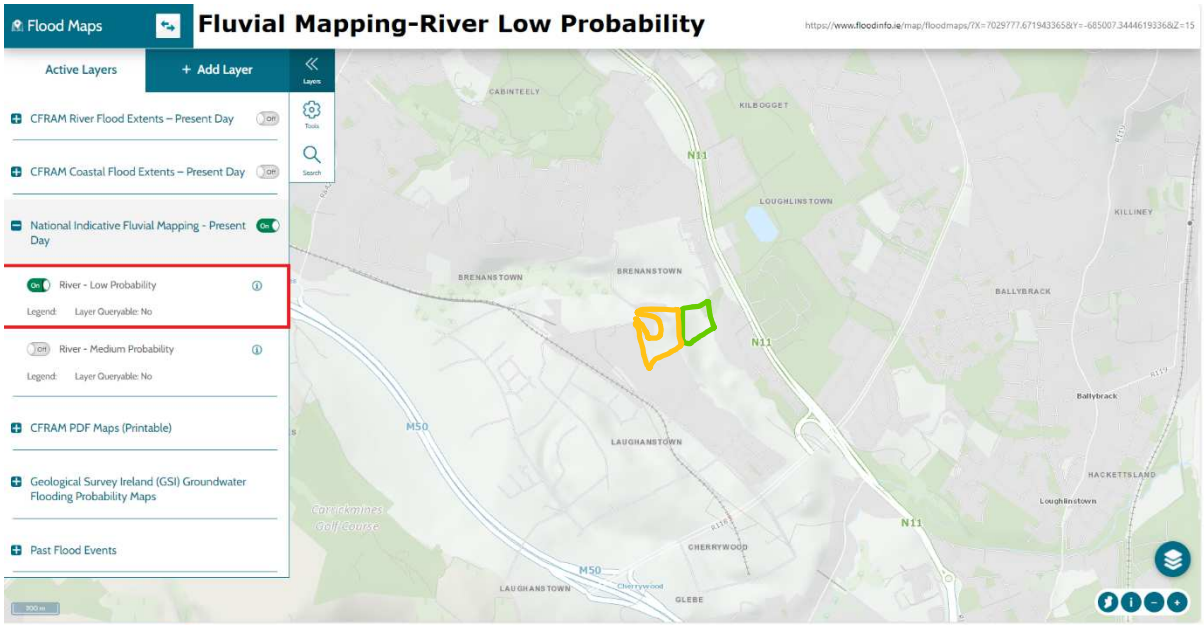
Within the light brown line is the Res 2- residentially zoned land; within the green line is the Green Infrastructure.

<u>Fluvial</u>

Fluvial flooding refers to flooding from rivers and streams (the word fluvial is derived from the Latin word for river, Fluvius). The Cabinteely River is located on the east border of the

land, approximately 131 m east of the Residential-zone side of the land. It can be seen from Figure 10 below that the proposed development site lies outside of the 0.1% AEP fluvial flood areas of the Cabinteely River.





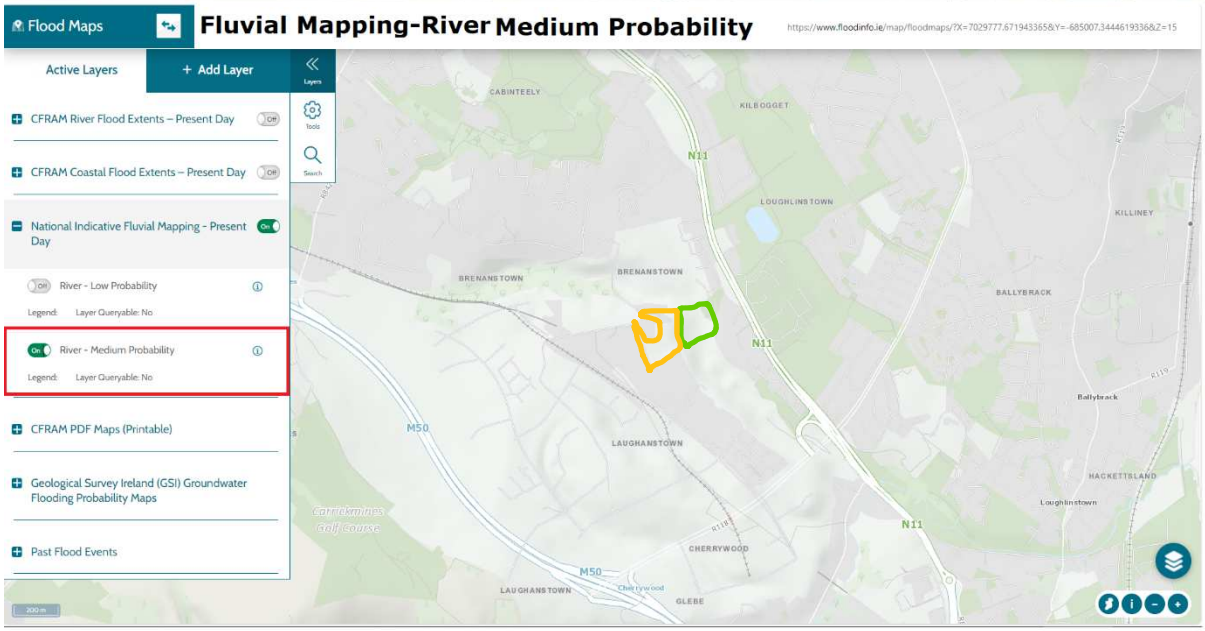


Figure 10 – Fluvial Flood Map
Within the light brown line is the Res 2- residentially zoned land; within the green line is the Green Infrastructure.

<u>Groundwater</u>

The OPW's Draft Preliminary Flood Risk Assessment (DPFRA) includes an assessment of

groundwater flood risk. The vast majority of extensive, recurring groundwater floods originate at turloughs. A preliminary nationwide groundwater flood hazard map has been produced. The map (figure 7) indicates no groundwater flood risk to the site or to the surrounding area.

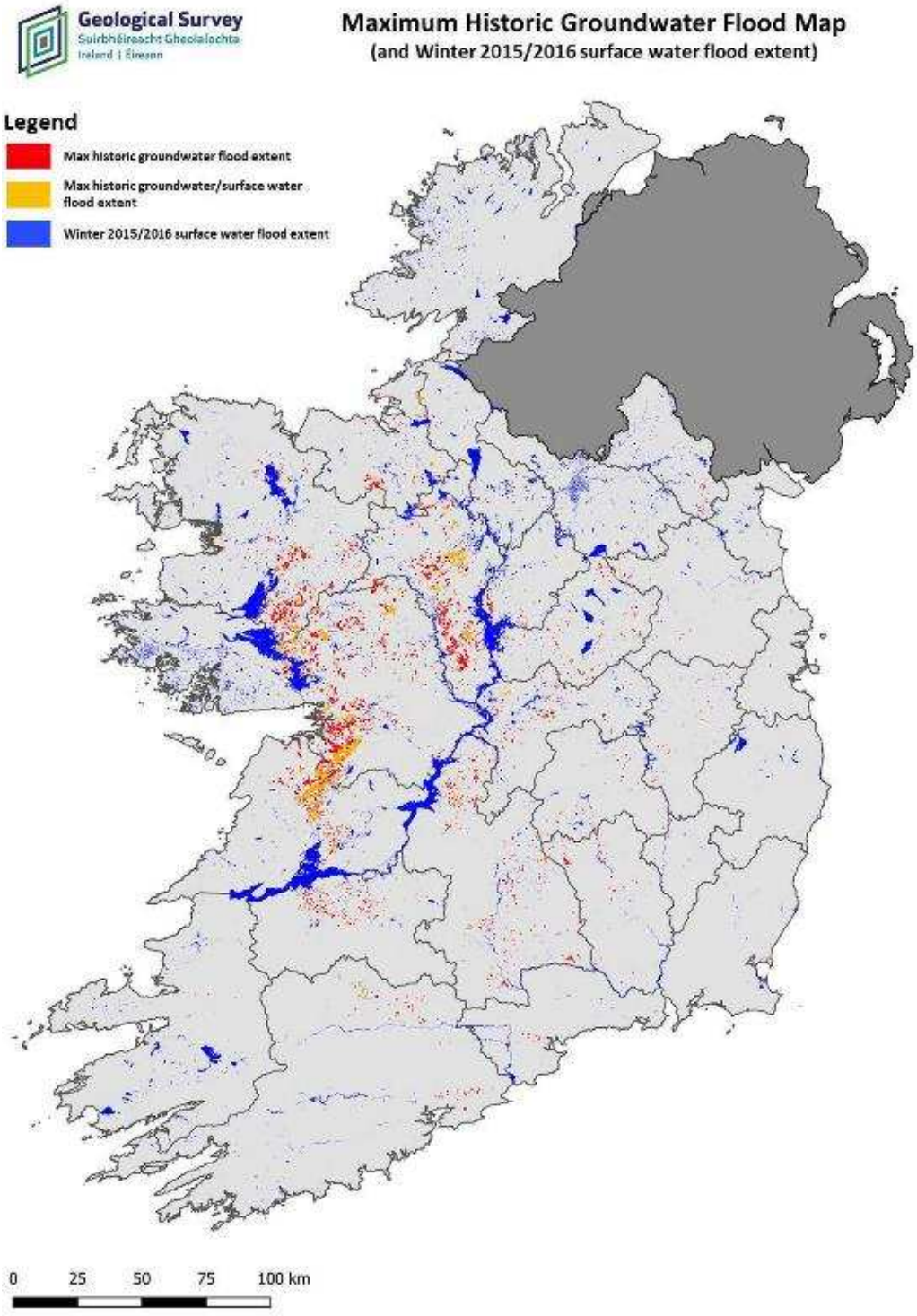


Figure 11 – DEFRA groundwater flood hazard map

According to data obtained from the Geological Survey of Ireland (http://www.gsi.ie), the subject site is located on made ground subsoil on top of Lucan formation limestone and shale (calp). It is located on a locally important aquifer with bedrock which is moderately productive only in local zones. The groundwater vulnerability assessment of the site shows that the vulnerability of groundwater in the area is low.

There is no record of groundwater flooding for the subject site. The probability of

groundwater rising above ground levels is considered extremely low. In any such event, water would follow overland flow routes.

It is concluded therefore that the flood risk represented by ground water is negligible and no further mitigation is required.

Pluvial

Pluvial flooding relates to flooding as a direct result of extreme rainfall. Pluvial flooding can occur in one of two ways during an extreme intensity rainfall event. If the rate at which water falls on the ground is faster than the rate at which the water can make its way to the drainage network then flooding will occur. This type of flood is referred to as "*ponding*". Flooding can also be caused by the overland flows from surcharged sewer networks. The main risk associated with the proposed development is deemed to be from pluvial flooding.

DLRCC County Development Plan Flood Map 10 does not show a Pluvial Flood event within the land. Neither does the Appendix E of the Cherrywood Planning Scheme. While the risk of Pluvial Flooding is always present, it is manageable within the principles of good civil engineering practice and SuDS design.

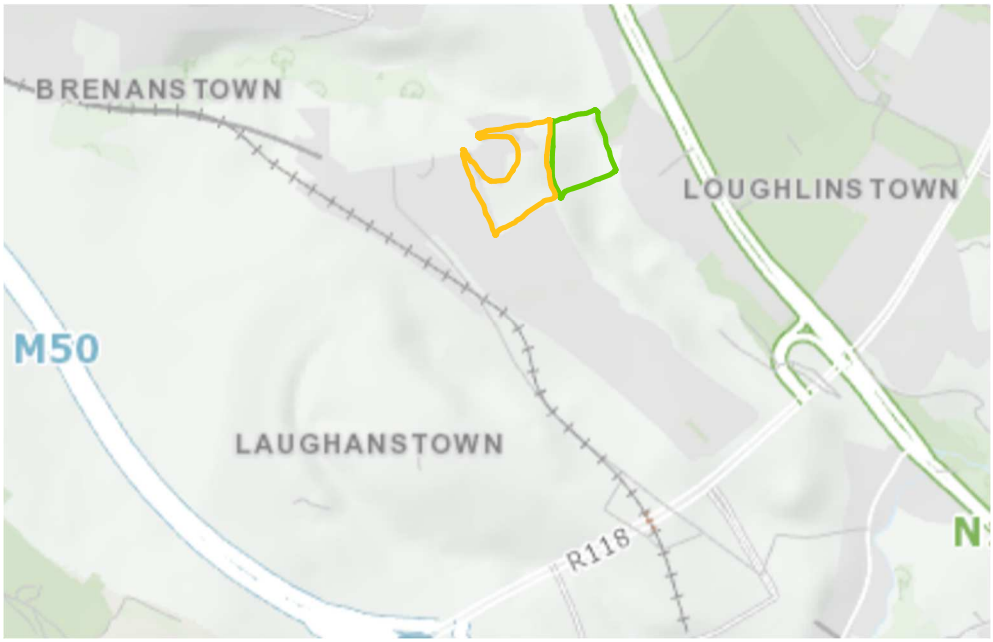


Figure 12 – Rainfall Flood Maps https://www.floodinfo.ie/map/floodmaps/
Within the light brown line is the Res 2- residentially zoned land; within the green line is the Green Infrastructure.

No pluvial flood events have been recorded on the land or its vicinity.

Coastal & Fluvial Mid-Range Future Scenario

Such Scenario is not necessary to be analysed because, as shown above, the Coastal Flood is not a risk. Neither is the Fluvial flooding a high risk to the Residential land.

3.4 Conclusion and Recommendation

This flood risk assessment has been carried out in accordance with the OPW publication "*The Planning System and Flood Risk Assessment Guidelines for Planning Authorities*" and with reference to DLRCC's SFRA. The flood risk assessment shows the proposed development is an appropriate development located in flood zone C.

The flood risks from coastal, fluvial, pluvial and groundwater flooding were considered. There was found to be no locally occurring flood events recorded on the Residential-zoned side of the land, where constructions are proposed. No groundwater flood risk to the site or to the immediate surrounding area was noted.

The site lies outside the active functional floodplain of the 0.1% AEP tidal flood event and the 0.1% AEP fluvial flood area. The site was assessed to consider the effect of flooding to the future. The Mid-Range Future Scenario maps were considered which show the extent of land that might be flooded by rivers and the sea in a very extreme flood event taking in in the potential effects of climate change using an increase in rainfall of 20% and sea level rise of 500mm. The site was found to lie outside the mid-range future flood areas for coastal and fluvial flooding.

The only notable risk associated with the proposed development is deemed to be from pluvial flooding. Pluvial flood maps for the proposed site do not indicate a flood hazard. However, it is recommended that the design is cognisant of managing surface water which may accumulate on site. The redevelopment shall incorporate Sustainable Drainage Systems (SuDS) in order to reduce the risks associated with Pluvial flooding.