Flood Risk Assessment

Proposed Development in Blarney, Co. Cork

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Contents

[1] Introduction

[1.1] Background

HRP Construction Limited has identified a brownfield site in Blarney, Co. Cork, for a proposed residential development.

HRP Construction Limited has commissioned Ayesa to conduct a Site-Specific Flood Risk Assessment (SSFRA) for the proposed residential development in accordance with the '*The Planning System and Flood Risk Management Guidelines for Planning Authorities*'. Further details on the proposed development are presented in Section 2 of this report.

[1.2] Report Objectives

This Flood Risk Assessment Report has been prepared to accompany an application by HRP Construction Limited to Cork City Council for planning permission for the proposed development. This report includes a Stage 1 – Flood Risk Identification of the proposed development site, a Stage 2 – Initial Flood Risk Assessment and a Stage 3 – Detailed Flood Risk Assessment.

The Stage 1 - Flood Risk Identification determines if there is a risk of flooding to the development while Stage 2 - Initial Flood Risk Assessment confirms the sources of flood risk, appraises the adequacy of existing information and assesses the extent of the risk of flooding and potential impact of a development on flooding elsewhere and of the scope of possible mitigation measures. The Stage 3 – Detailed Flood Risk Assessment assesses flood risk issues in sufficient detail and provides a quantitative appraisal of potential flood risk to the proposed development, of its potential impact on flood risk elsewhere and of the effectiveness of any proposed mitigation measures.

[1.3] Flood Risk & Methodology

Understanding flood risk is a key step in managing the impacts of flooding. Flood risk is a combination of the likelihood of flooding and the potential consequences arising. The methodology used for this Flood Risk Assessment is based on *'The Planning System and Flood Risk Management, Guidelines for Planning Authorities (2009)'* (FRM Guidelines) published jointly by the DECLG and the Office of Public Works (OPW). These guidelines recommend a staged approach to flood risk assessment that covers both the likelihood of flooding and the potential consequences.

The likelihood of flooding is normally defined as a percentage probability of a given magnitude or severity occurring or being exceeded in any given year. The consequence of flooding depends on the hazards associated with the flooding, and the vulnerability of people, property and the environment potentially affected by a flood.

[2] Site Location and Description

[2.1] Site Location and Setting

The proposed development (subject site) is located in Blarney town with access via St Ann’s Road (R617), to the west of The Square. The proposed development is on a brownfield site, formally the Blarney Park Hotel which has since been demolished. The Blarney Castle car park is located to the east of the site while the Blarney Castle and Gardens are to the south. The western boundary is boarded by green fields. The site boundary is shown in Figure 2-1.

The main Blarney River rises north of Blarney near Whitchurch. Upstream of the historic Gothic Bridge and downstream of the more recent Inchancomain Bridge the channel bifurcates, one channel flowing alongside Blarney GAA grounds and the other further to the south.

The River Martin rises north of Grenagh and flows south towards Blarney. It flows southwest through the village and passes approx. 80m southeast of the site, before it discharges into the Blarney River approx. 200m south of the site. It is believed that it flows over the northern bifurcation channel of the Blarney River within the grounds of Blarney Castle, refer to Figure 2-2.

The local stream/drain running along the southern boundary of the site, is fed by the northern bifurcation of the Blarney River and flows west for 1km before discharging into the Blarney River. This channel is an historic channel, evidence in the 25” OS Maps.

A small drain runs along the western boundary which discharges into the local stream to the south of the site. A drain is also located to the north of the site along St. Ann’s Road. The drain originates in the green fields north of St. Ann’s Road and is culverted under the road, outfalling into the field north of the site.

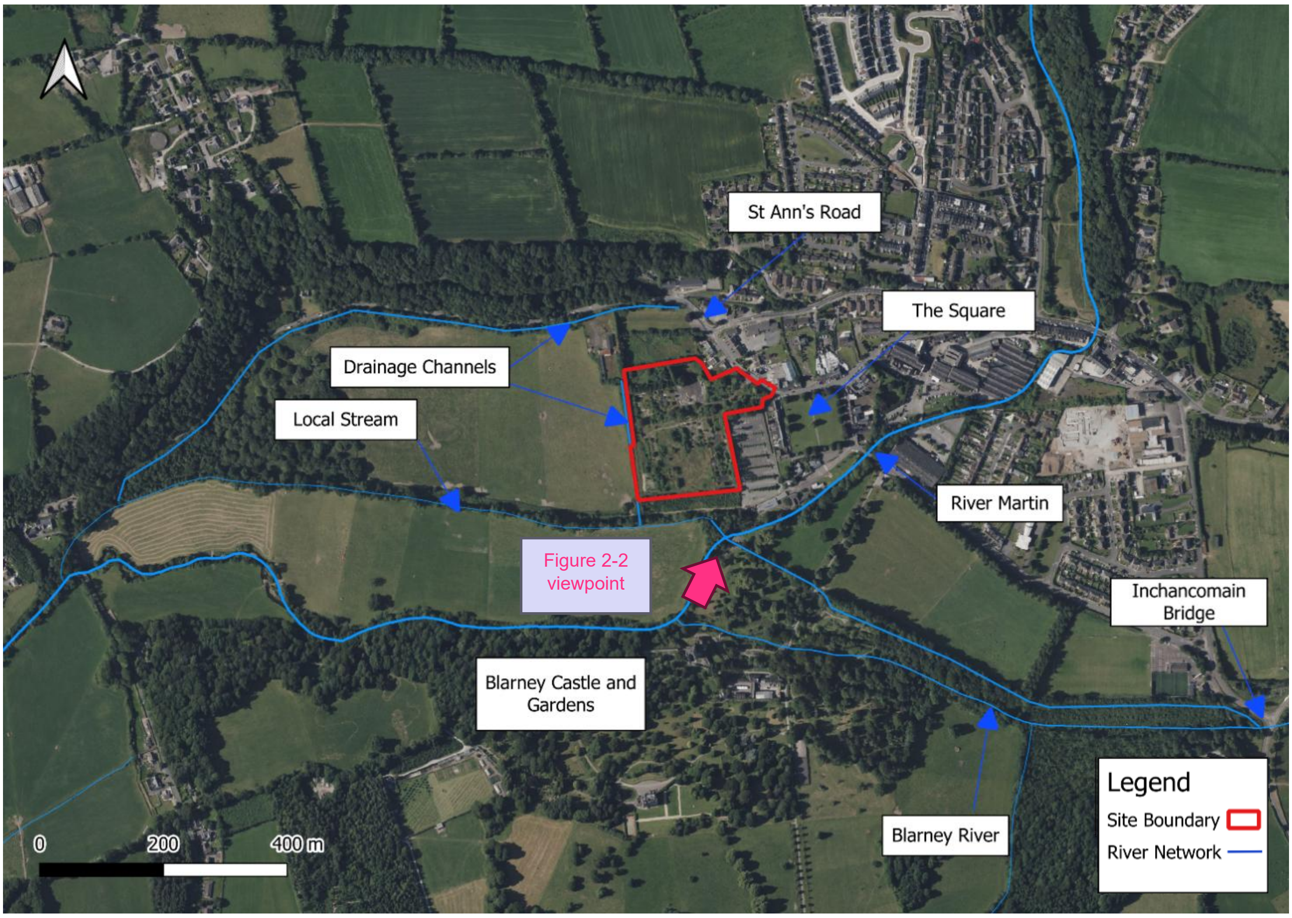

Figure 2-1: Site Location

Figure 2-2: Google Streetview® Image for confluence of River Martin & Local Stream (Blarney River Branch)

[2.2] Proposed Development

HRP Construction Limited are applying for planning permission for the construction of scheme comprising of 138 no. residential units, a civic centre and all ancillary works on a site spanning 3.7 ha. The proposed development is shown in the Figure 2-3 below, also provided in Appendix A.

Figure 2-3: Proposed Development (March 2026)

[2.3] Planning History

[2.3.1] Planning Application: 125084

This application was for the construction of a discount food store and retention and complete demolition of the former Blarney Park Hotel. This planning application was granted approval by CCC in July 2012. The demolition works were completed but the food store was not constructed.

[2.3.2] Planning Application: 2039597

This application was for the construction of a mixed-use development comprising hotel, licensed supermarket, coffee shop, office block, commercial building and 70 no. residential units. This application was refused by Cork City Council, granted by An Bord Pleanála, but quashed in the High Court in December 2022.

The application was refused based on several grounds including architecture, heritage policies, zoning, etc. It is noted that a Flood Risk Assessment was submitted with the application which was concluded satisfactory as there were no concerns relating to the FRA. The FRA included a site-specific model which confirmed the site was at a low risk of flooding from fluvial sources in both the present day and climate change scenarios. The FRA also concluded that there was no risk to the site from residual risks such as structure blockage.

[3] Planning Guideline & Flood Risk Assessment

[3.1] The Planning System and Flood Risk Management Guidelines for Planning Authorities

The FRM Guidelines provide "*mechanisms for the incorporation of flood risk identification, assessment and management into the planning process…."* This ensures a consistent approach throughout the country requiring identification of flood risk and flood risk assessment to be key considerations when preparing development plan, local area plans and planned developments.

"The core objectives of the FRM Guidelines are to:

- 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;
- Avoid unnecessary restriction of national, regional, or local economic and social growth;
- Improve the understanding of flood risk among relevant stakeholders; and
- Ensure the requirements of EU and national law in relation to the natural environment and nature conservation are compiled with at all stage of flood risk management.

The key principles of the FRM Guidelines are to apply the Sequential Approach (see Figure 3-1 below) to the planning process i.e.:

- Avoid the risk, where possible,
- Substitute less vulnerable uses, where avoidance is not possible, and
- Mitigate and manage the risk, where avoidance and substitution are not possible."

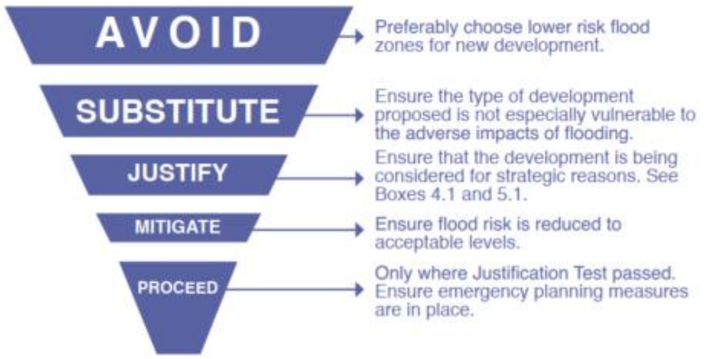

Figure 3-1: Sequential Approach Principles in Flood Risk Management

When the Sequential Test's '**avoid** and **substitute**' principles are not appropriate then the FRM Guidelines require that a Justification Test be applied to assess the appropriateness, or otherwise of developments that are being considered in areas of moderate or high flood risk. Figure 3-2 below illustrates the sequential approach mechanism adopted for the planning process which applies to this FRA.

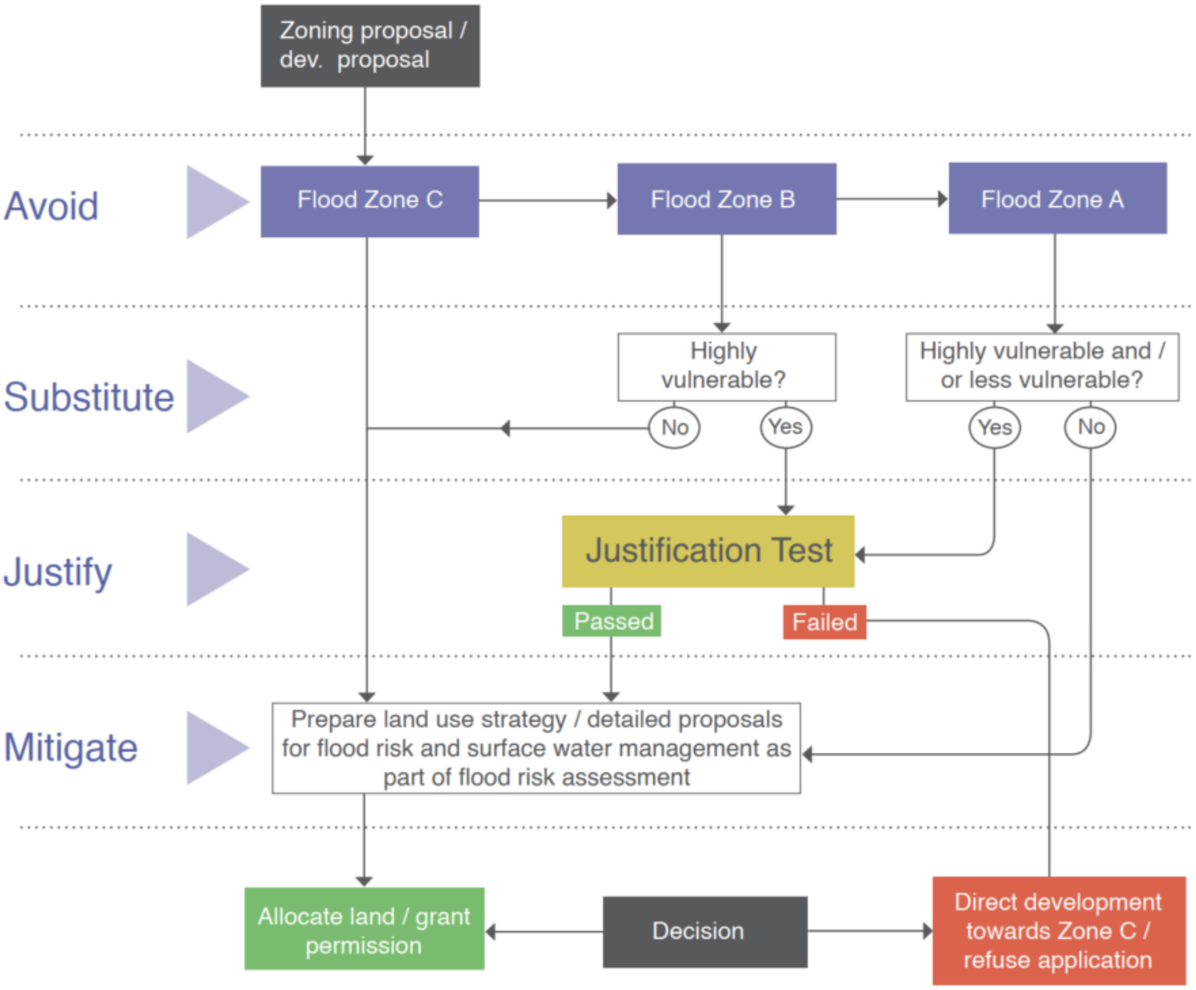

Figure 3-2: Extract of FRM Guidelines, Sequential Approach mechanism in the planning process.

[3.2] Flood Risk Assessment

The assessment of flood risk requires 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), as indicated in Figure 3-3 below.

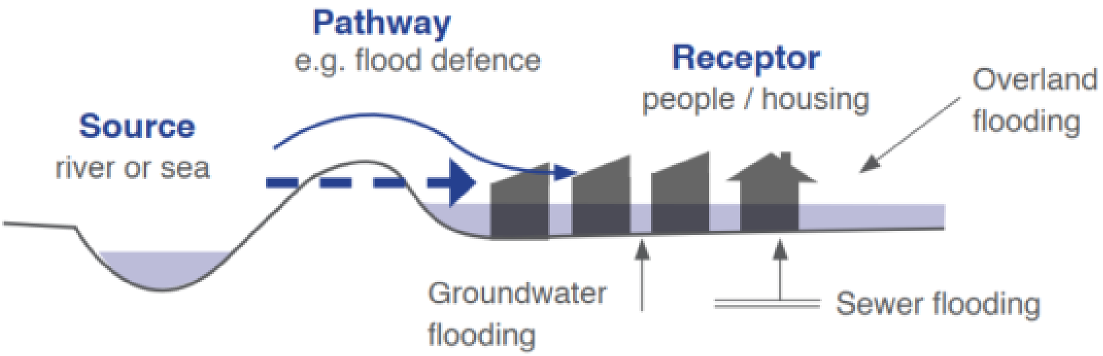

Figure 3-3: Source-Pathway-Receptor Model

The principal pathways are rivers, drains, sewers, overland flow and river and coastal flood plains and their defences assets. The receptors can include people, their property, and the environment. All three elements must be examined as part of the flood risk assessment including the vulnerability and exposure of receptors to determine its potential consequences. Mitigation measures typically used in development management can reduce the impact on people and communities i.e., by blocking or impeding pathways. The planning process is primarily concerned with the location of receptors and potential sources and pathways that might put those receptors at risk.

Risk to people, property and the environment should be assessed over the full range of probabilities, including extreme events. The flood risk assessment should cover all sources of flooding, including the effects of run-off from a development on flood risk both locally and beyond the development site.

[3.2.1] Flood Risk Assessment Stage

The FRM Guidelines outline that a staged approach should be adopted when conducting a flood risk appraisal or assessment. These stages are:

- Stage 1 Flood risk identification
- Stage 2 Initial flood risk assessment
- Stage 3 Detailed flood risk assessment

The FRM Guidelines require an FRA be undertaken to assess flood risk for individual planning applications. This FRA comprises Stage 1 and 2 involving identification and assessment of flood risks and surface water management related to the planned development site.

[3.3] Flood Zones

Flood zones are geographical areas within which the likelihood of flooding is in a particular range. They are a key tool in flood risk management within the planning process as well as in flood warning and emergency planning. There are three types or levels of flood zones defined for the purposes of the FRM Guidelines. Table 3-1 describes the three flood zones.

Table 3-1: Flood Zones

Zone	Description
Zone A 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).
Zone B Moderate probability of flooding	This zone defines areas with a moderate risk of flooding from rivers (i.e., 1% to 0.1% probability or between1 in 100 and 1 in 1000) and the coast (i.e., 0.5% to 0.1% probability or between 1 in 200 and 1 in 1000).
Zone C 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).

[3.4] Proposed Development's Vulnerability

The proposed development includes residential development for the purpose of flood risk assessment. Residential developments are categorised as **highly vulnerable** development and are appropriate to locate within Flood Zone C. To provide highly vulnerable and less vulnerable type development within Flood Zone A or B requires a Justification Test to be completed to justify development in this moderate flood risk area.

[4] Flood Risk Identification

Possible sources of flood risk were identified by collating the information described in the sections below.

[4.1] Topography

Topographic survey was conducted at the site in June 2010. A contour map of the site, with a spacing of 0.25m, is shown in Appendix B. The topography of the site slopes to the west. The high point of the site is 30.36mOD along the eastern boundary by St. Ann's Road. The low point is 28.34mOD along the northern boundary. The topographic survey of the site includes the hardstanding ground from the former Blarney Park Hotel (29.8-30mOD) and a raised rubble patch in the southeast corner (32.66mOD). It is noted that some of the structures/buildings on site have been removed since this survey was completed.

The topography survey of the site also identifies the local drain along the western boundary. Local drains can typically be defined as a surface water flood source; surface water drains would have been dug to assist with local drainage issues. The drain discharges into the local watercourse to the south of the site.

[4.2] Geology and Groundwater

The geology in the site boundary was reviewed using www.gsi.ie, subsoils (Quaternary Sediments). The subsoil is presented in Figure 4-1.

The proposed site is underlain by Made Ground with a section of Alluvium sediments along the northern boundary of the site. The site is also surrounded by both Alluvium sediments and made ground. Alluvium sediments are river deposits indicating an area which was historically subject to flooding.

The subsoil permeability in the site boundary was reviewed using www.gsi.ie, Geohive Groundwater Subsoil Permeability layer. Subsoil permeability is defined as low, medium, or high (L, M, H). Some areas have not been mapped, and this could be due to several reasons, of which one is that rock is present near the surface. Waterbodies are mapped as water.

Figure 4-2 shows the subsoil permeability of the area. At the site, the permeability in the northern section is moderate while the permeability in the southern section is high.

Figure 4-1: GSI Subsoils

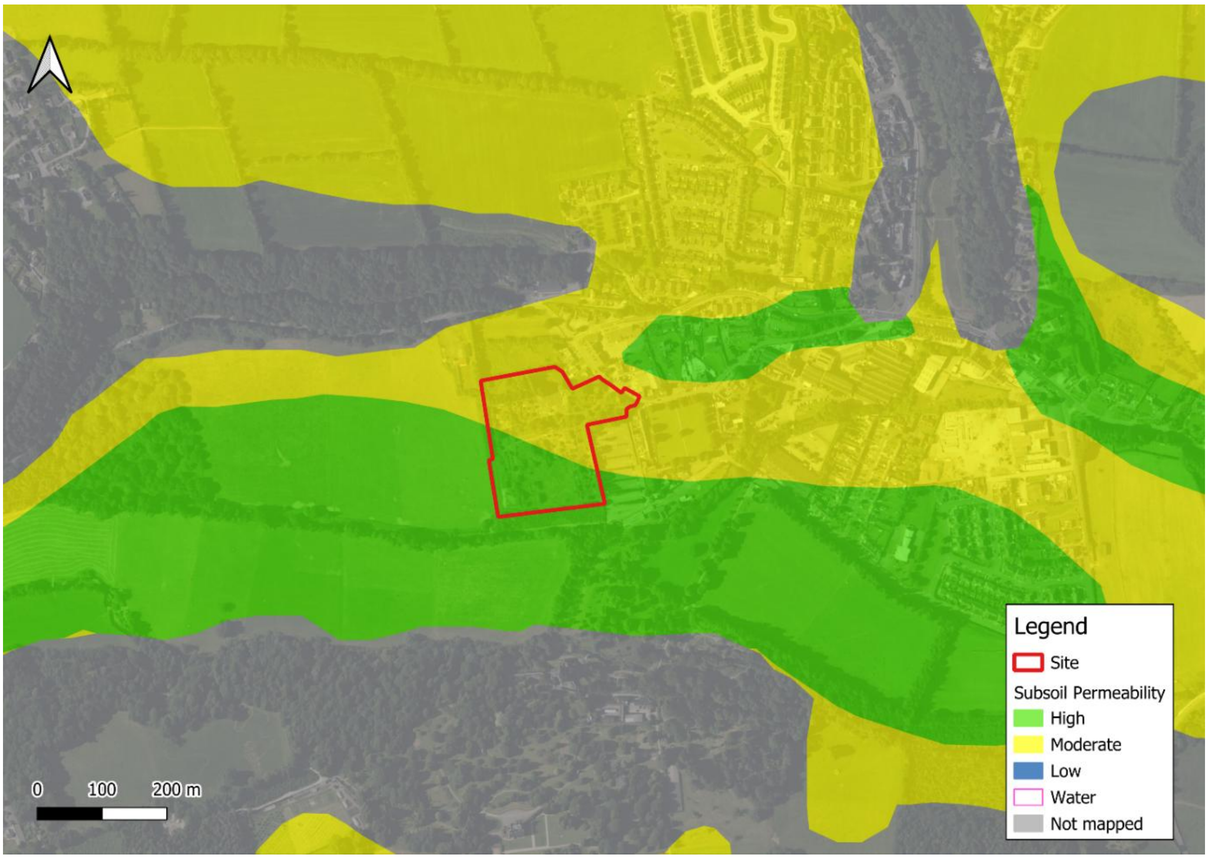

Figure 4-2: Subsoil Permeability

[4.3] Flood History

[4.3.1] Historic OSi Maps

A review of the historic 6” (1829-1842) and 25” (1888-1913) OSi maps, available from the Geohive, was undertaken. The historic 6” and 25” maps are shown in Figure 4-3 and Figure 4-4 respectively.

The 6” mapping shows the site as a greenfield in Figure 4-3 below. The Blarney River and River Martin are shown in a solid dark blue line on the 6” mapping.

The 25” mapping shows the greenfield site. The Blarney Branch of the old raiway line runs along the southern boundary of the site. A local stream runs along the southern side of the railway line and the open drain is shown along the western boundary and further north of the site. These watercourses are shown in a dashed blue line on the 25” mapping. The Blarney River and River Martin are shown in a solid dark blue line.

The maps do not mention any previous flooding or indicate any areas that are liable to flooding.

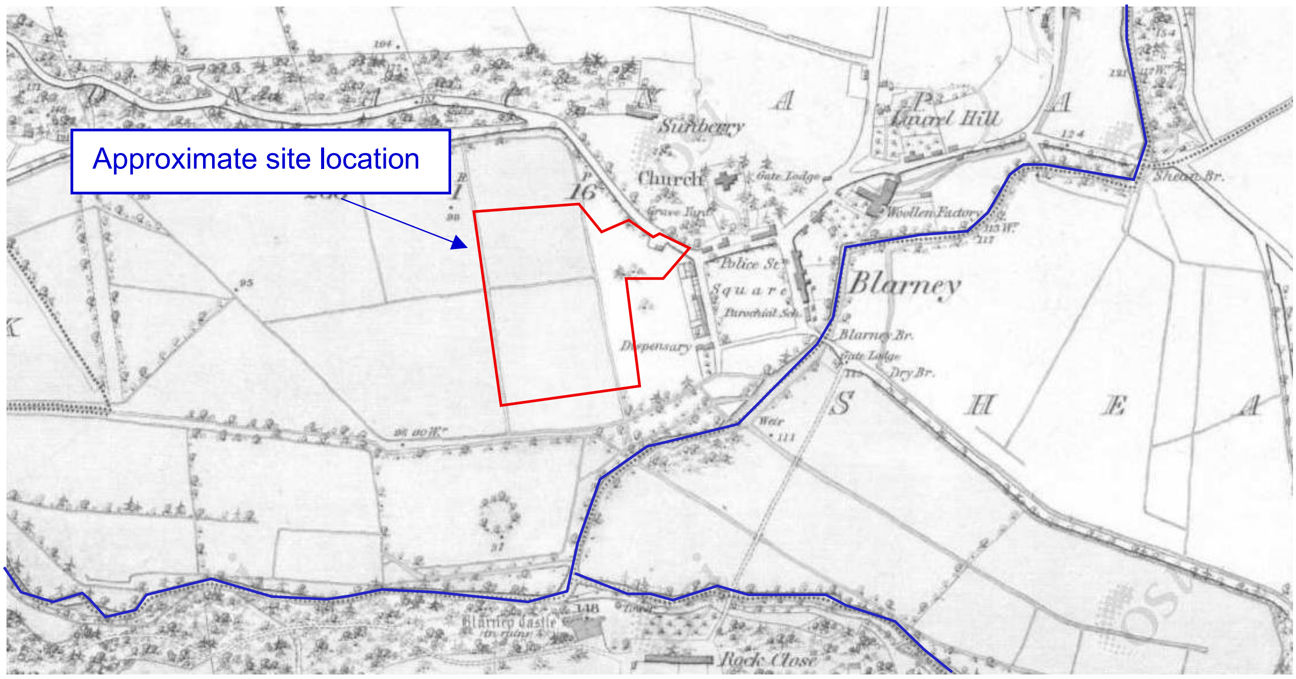

Figure 4-3: 6" OSi Map (Source: www.geohive.ie)

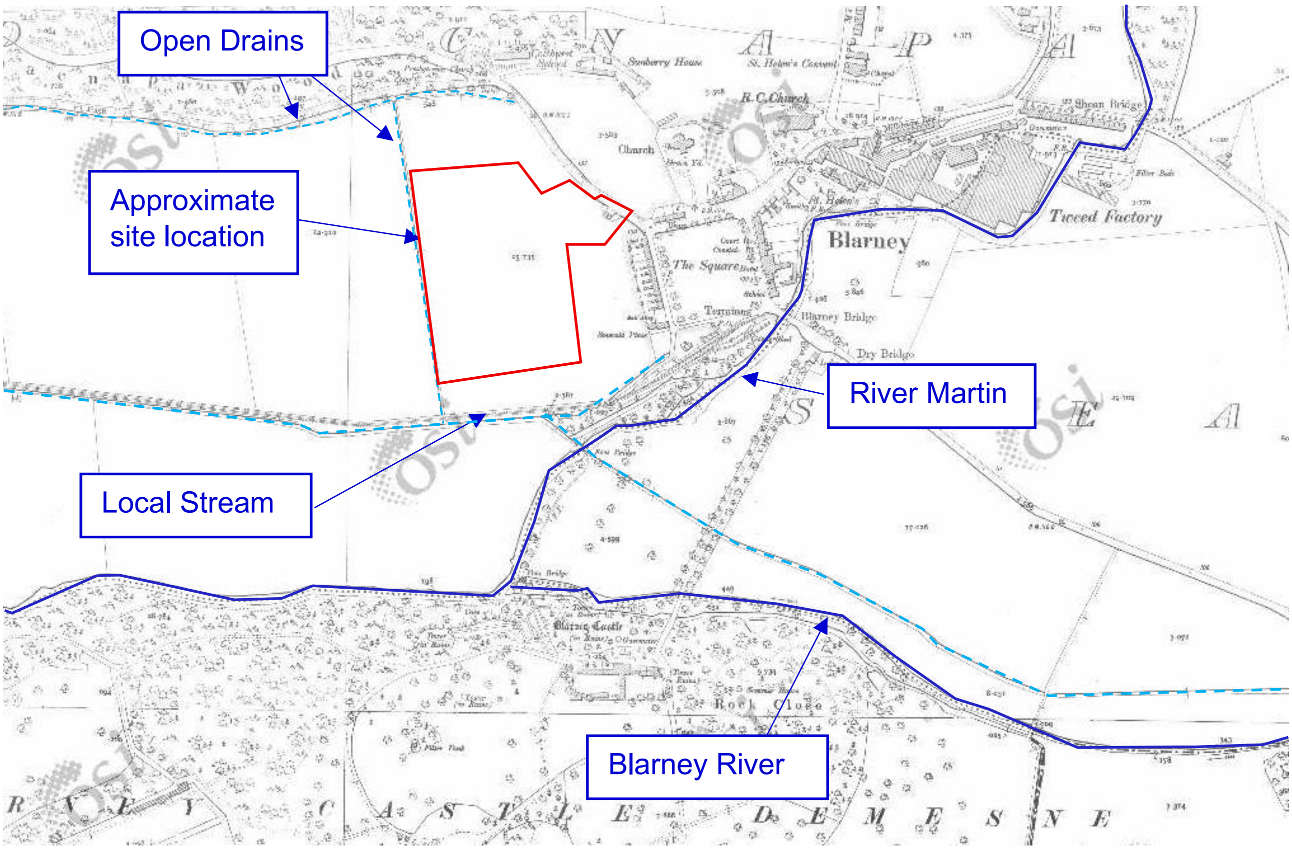

Figure 4-4: 25" OSi Map (Source: www.geohive.ie)

[4.3.2] Internet and newspaper reports

An internet search for newspaper reports on flooding in Blarney was undertaken. One online article noted flooding in December 1948, 1968, and 1974[1], but no specific accounts of flooding at the development site were found.

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[1] http://blarneyhistory.ie/pollution-and-flooding-of-the-river-martin/

[4.3.3] OPW Flood Database

A search of the OPW floodinfo.ie website for flood reports in the area surrounding the subject site was undertaken. The results indicated that while several flood events are recorded in the Blarney area, three flood events occurred near the proposed site. Refer to Figure 4-5 for the locations of the flood events. Reports on the historical flood events can be found in Appendix C and is summarised below:

- Flood ID 1477: 06/02/1990 – River Martin flooding in Blarney village.
- Flood ID 14064: 12/01/1988 – Flooding at Blarney Castle on 23/02/2021. No further information provided.
- Flood ID 5239: 05/11/2000 - Martin River Blarney Shamrock Terrace.

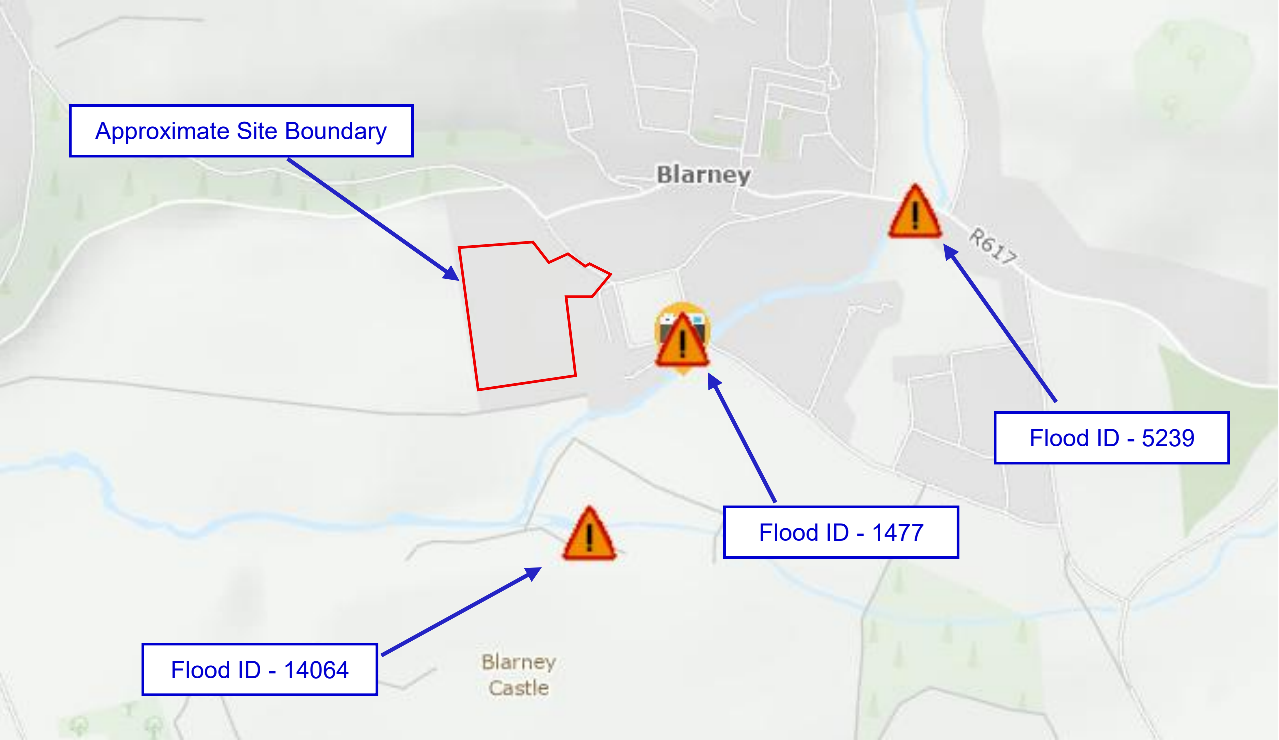

Figure 4-5: Locations of Past Flood Events (Source: www.floodinfo.ie)

[4.3.4] Winter 2015/2016 Surface Water Flooding

Geological Survey Ireland have developed Groundwater Flood Maps for the Republic of Ireland. The maps were developed as part of the 2016-2019 GWFlood project in collaboration with Trinity College Dublin and the Institute of Technology Carlow.

The Winter 2015/2016 Surface Water Flood map shows fluvial (rivers) and pluvial (rainfall) flood extents. The map excludes urban areas, during the winter 2015/2016 flood event, and was developed as a by-product of the historic groundwater flood map. While flooding was observed in the greenfield to the west of the site, no flooding was recorded at the site.

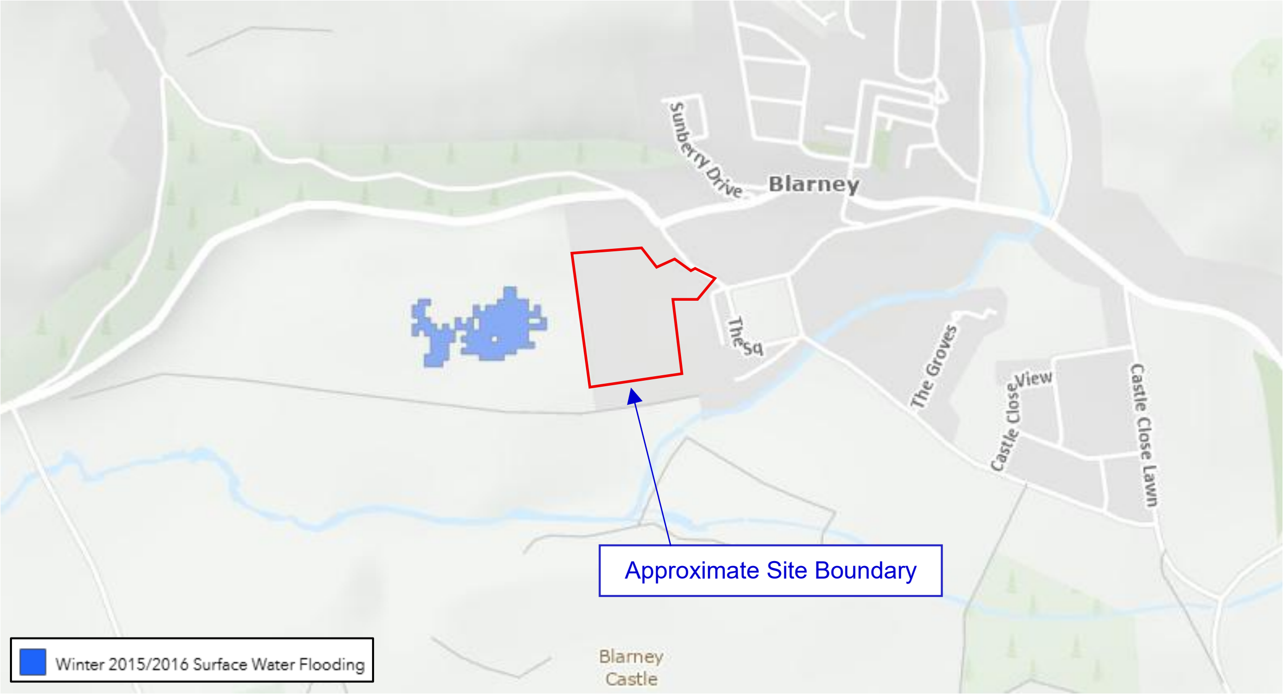

Figure 4-6: Winter 2015/2016 Surface Water Flooding

[4.3.5] SAR Seasonal Flood Maps

The SAR (Synthetic Aperture Radar) Seasonal Flood Maps show observed peak flood extents which took place between certain time periods. The maps were made using SAR images from the Copernicus Programme Sentinel-1 satellites. The seasonal flood maps are available from 2015 to 2021. Review of the flood maps show that while flooding was observed in the greenfield to the west and south of the site (albeit low confidence in the extents), no flooding was recorded at the site.

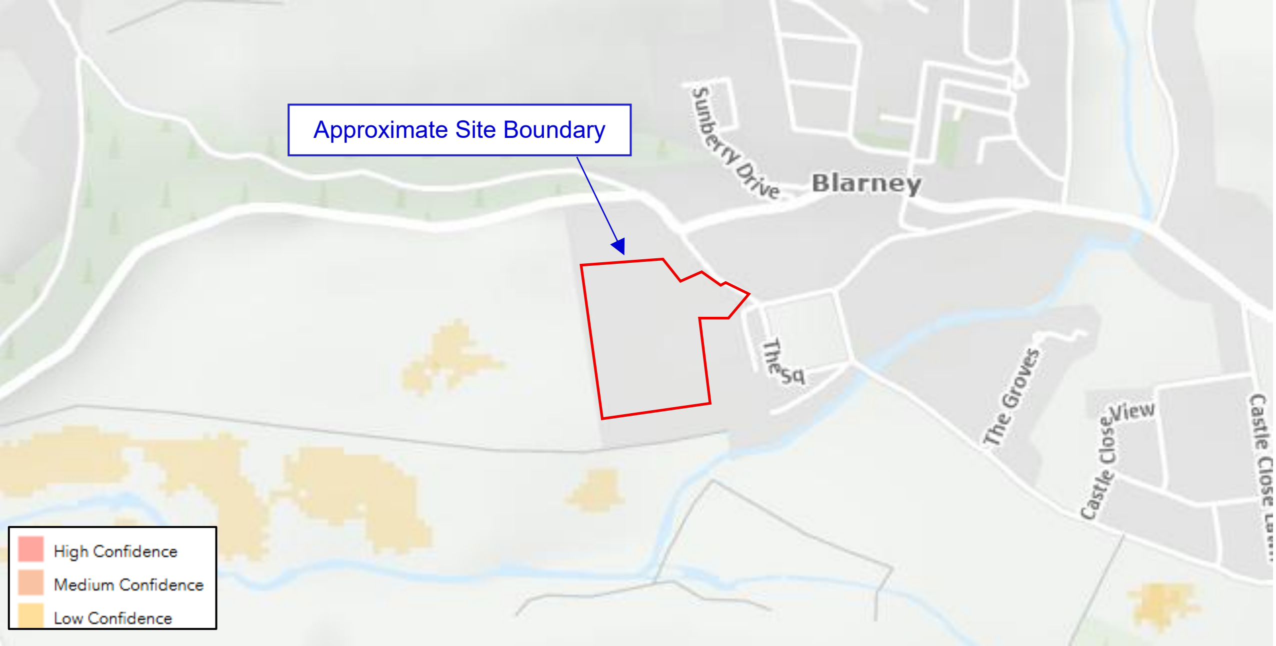

Figure 4-7: SAR Seasonal Flood Maps

[4.3.6] GSI Historic Groundwater Flood Map

The GSI Historic Groundwater Flood Map shows the observed peak flood extents caused by groundwater in Ireland. The map was produced using satellite images (Copernicus Programme Sentinel-1), field data, aerial photos, as well as flood records from the past. Most of the data was collected during the flood events of winter 2015 / 2016, as in most areas this data showed the largest floods on record. The historic groundwater map does not show any groundwater flood events observed at the site.

[4.4] CFRAM Study

The Office of Public Works (OPW) and its partners, Cork County Council have undertaken the Lee Catchment Flood Risk Assessment and Management Study (Lee CFRAM), a catchment-based flood risk assessment and management study of the entire Lee Catchment including its tributaries. CFRAM Flood Maps have not been produced for the Blarney area however, fluvial flood extents are available on floodinfo.ie. There is no coastal flood risk in Blarney.

[4.4.1] Present Day Flood Extents

Figure 4-8 shows the flood extents in Blarney town. The fluvial current scenario flood extents identify the site as being at a low risk of flooding in the 1% and 0.1% AEP flood events. The 1% and 0.1% AEP flood events correlate with Flood Zone A and B, respectively. Therefore, the site is shown to be in Flood Zone C.

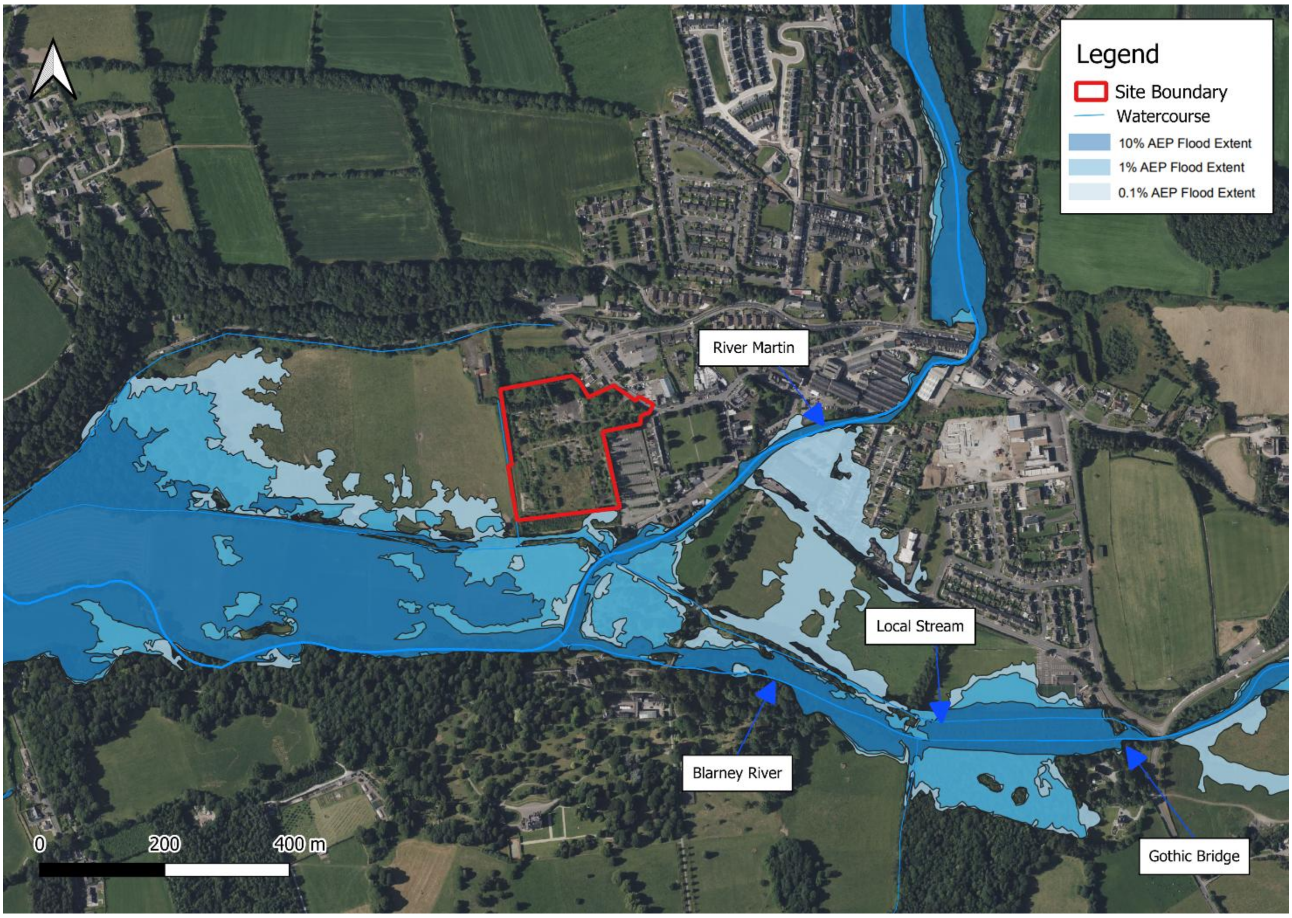

Figure 4-8: CFRAM Flood Extents

[4.4.2] Climate Change Flood Extents

Flood Extents were also produced for the Mid-Range Future Scenario (MRFS) climate change events. Figure 4-9 shows the MRFS flood extents in Blarney town. The flood extents identify the site as being partially inundated in the southern section of the site in the 0.1% AEP MRFS flood event. This event is considered a greater than exceedance event in terms of residential flood risk management.

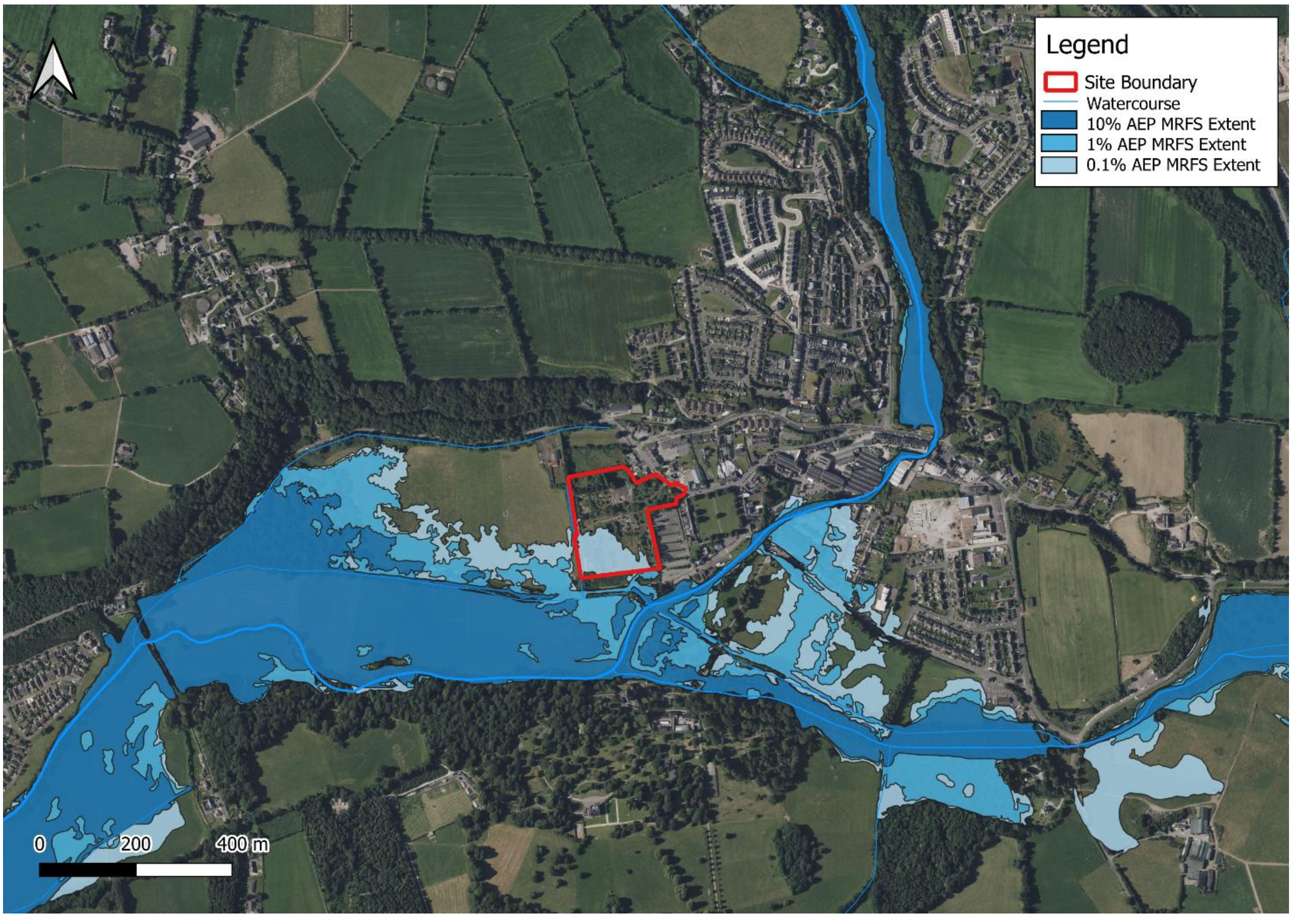

Figure 4-9: CFRAM MRFS Flood Extents

[4.5] Cork City Development Plan 2022-2028 (CCDP)

[4.5.1] Zoning

The Zoning Map, developed as part of the '*Cork City Development Plan 2022'* (CCDP), can be found in Appendix D. The proposed site is zoned ZO 03: 'Long-term Strategic Regeneration' which is *'to provide and promote a mix of residential, employment and other uses in the long term, to ensure the creation of a vibrant, compact and sustainable urban area.'*

The site is also identified as an Architectural Conservation Area. As per the CCDP, *'the designation of Architectural Conservation Areas is intended to encourage development in historic areas that promotes a high standard of design and detail, enhancing Cork City's existing historic morphology, varied architectural styles and use of materials, but which adds new qualities from our own time, making its own contribution to the city's evolving identity.'*

[4.5.2] Strategic Flood Risk Assessment

The Strategic Flood Risk Assessment (SFRA) for the CCDP addresses the flood risk in the Blarney area. The flood maps within the CCDP are based on a combination of available flood information for both coastal and fluvial sources. In Blarney, the CFRAM flood maps have been used to define Flood Zone A and B. As discussed in Section 0 above, the site is within Flood Zone C.

[4.6] Summary of Stage 1 Assessment

The Stage 1 Assessment (Flood Risk Identification) has identified a flood risk to the area surrounding the site. Although the site itself is not found to be at risk at flooding, given the proximity of the site to the 1% AEP flood extents produced as part of the CFRAM mapping, a Stage 2 FRA will be carried out to provide a more comprehensive assessment of the flood risk.

[5] Initial Flood Risk Assessment

The purpose of the Initial Flood Risk Assessment is primarily to ensure that the relevant flood risk sources are identified so that they can be addressed appropriately in the Detailed Flood Risk Assessment (Stage 3), included in Section [6] of this report.

[5.1] Fluvial Flooding

The CFRAM Study and the SFRA for the CCDP identify the site as being in Flood Zone C from fluvial sources and at a low risk of flooding. In the climate change scenarios, the site is shown to be at risk in the 0.1% MRFS event.

Table 5-1 below provides the present-day fluvial flood levels for the relevant nodes on the River Martin and Blarney River. 8MAR_136 is the closest node to the site, located directly upstream of the Local Stream crossing. 8MAR_136Bu is located downstream of footbridge at this location. Table 5-2 below provides flood levels for the MRFS flood events. Figure 5-1 shows the locations of the CFRAM nodes adjacent to the site. The flows are available from the Lee CFRAM Hydraulics Report[2].

As the CFRAM study is a broadscale modelling assessment, further analysis of the Lee CFRAM Study is carried out in order to confirm the modelling assessment is suitable for use as part of this SSFRA.

Table 5-1: Fluvial Flood Levels from the CFRAM Study Hydraulics Report

Node	River/Stream	10% AEP Flood Level (mOD)	1% AEP Flood Level (mOD)	0.1% AEP Flood Level (mOD)
8MAR_270	River Martin	30.15	30.38	30.52
8MAR_154	River Martin	29.82	30.00	30.05
8MAR_136	**River Martin**	**29.62**	**29.95**	**30.12**
8MAR_136Bu	River Martin	29.62	29.81	29.87
8MAR_105	River Martin	29.42	29.65	29.71
8MAR_0	River Martin	29.03	29.18	29.26

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[2] OPW Lee CFRAM Hydraulics Report (2014)

Table 5-2: MRFS Fluvial Flood Levels from the CFRAM Study Hydraulics Report

Node	River/Stream	10% AEP Flood Level (mOD)	1% AEP Flood Level (mOD)	0.1% AEP Flood Level (mOD)
8MAR_270	River Martin	30.29	30.48	30.60
8MAR_154	River Martin	29.89	30.04	30.06
8MAR_136	**River Martin**	**29.78**	**30.08**	**30.18**
8MAR_136Bu	River Martin	29.75	29.86	29.91
8MAR_105	River Martin	29.58	29.69	29.74
8MAR_0	River Martin	29.12	29.23	29.33

Figure 5-1: CFRAM Node Locations

[5.2] Pluvial Flooding

Pluvial, or surface water flooding, is a result of rainfall-generated flow that arise before run-off can enter a watercourse or sewer. It is usually associated with high intensity rainfall. Flood risk from pluvial sources exists in all areas. Adequate storm water drainage systems will minimise the pluvial flood risk.

The local drainage channel along the western boundary is a potential pluvial flood risk if it were to overtop. Review of the topography of the area shows the field to the west is at a lower elevation, refer to Figure 5-2. Therefore, if the drainage channel was to overtop, overland flow route would be to the west. A similar flood mechanism is applicable to the drainage channel to the north of the site. An overland flow route from this drain would continue along lower ground levels to the southwest rather than towards the proposed site. Mitigation measures haven been recommended in Section [6.4] below to ensure the pluvial flood risk is managed.

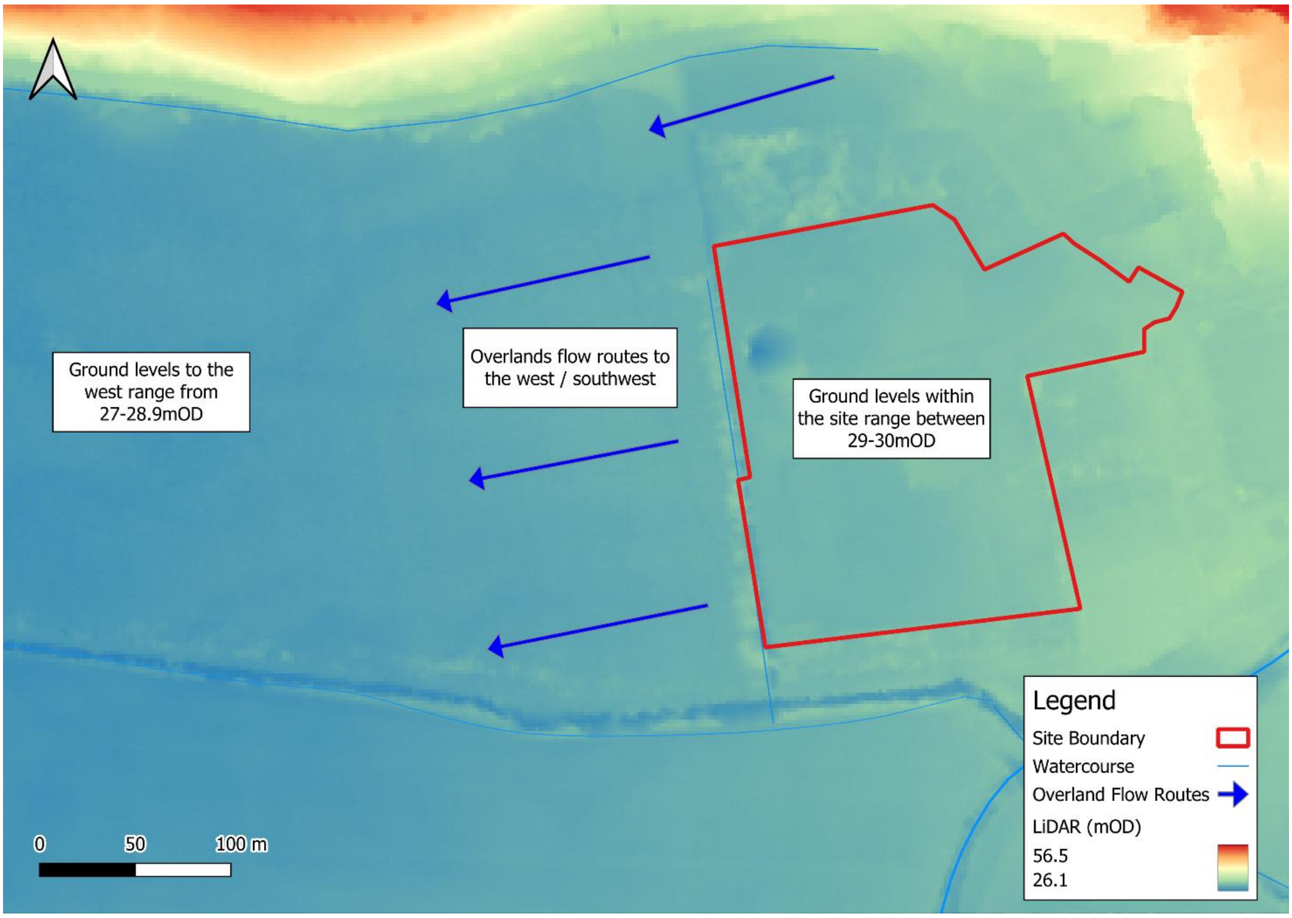

Figure 5-2: Overland Flow Routes

[5.3] Groundwater Flooding

Groundwater flooding results from high sub-surface water levels that impact upper levels of the soil strata and overall areas that are usually dry.

Groundwater is not considered to be a flood risk to the site from the GSI Flood Map and therefore has been screened out at this stage.

[6] Detailed Flood Risk Assessment

As detailed in the section above, further analysis of the Lee CFRAM Study is required to assess the fluvial flood risk in sufficient detail, i.e. a Stage 3 Detailed assessment. This will provide a quantitative evaluation of the potential flood risk to the proposed development and its potential impact on flood risk elsewhere.

CFRAM flood maps are noted as generally not being suitable for site-specific Flood Risk Assessments (SSFRAs) as they are community-based, indicative maps designed to identify general flood risk, rather than to define the precise risk to a specific site. While these maps can highlight potential risks, they typically lack the local and temporal precision necessary for a detailed site-specific assessment.

The following are some key reasons why CFRAM maps are not considered suitable for such assessments:

- The peak flood estimates specifically for larger catchments may not be appropriate for SSFRAs.
- The river channel survey data and Digital Terrain Model (LiDAR) data used in the models may be too coarse for site-specific analysis.
- CFRAM studies are limited to modelling main watercourses, often excluding local drainage channels and smaller streams from the hydraulic models.

The sections below provide further discussion of these points, demonstrating how these issues can be addressed through a quantitative appraisal of flow estimates, a detailed analysis of the survey data, and a review of the watercourse representation. This will confirm whether the Lee CFRAM Study can be appropriately used in this SSFRA.

[6.1] Peak Flood Estimate Analysis

The Flood Studies Update (FSU) programme, undertaken by the OPW, provides improved extreme rainfall and flood estimation methods for Ireland. It is the most recent major study of its kind and is widely recognised as the best practice method for estimating peak flood flows. One of the key outputs from the FSU was the 7-variable regression equation for estimating QMED based on Physical Catchment Descriptors (PCDs). The FSU 7-variable equation has since been superseded by the FSU2 7-variable equation, which was released in 2024 for flow estimation. QMED values for both methodologies are presented below for comparison, alongside the flows derived from the CFRAM Study. It should be noted that the FSU2 7-variable equation was estimated using the FSU spreadsheet available from floodinfo.ie. The FSU Spreadsheet also allows for the use of one or three pivotal sites.

The FSU nodes for each of the catchments were selected downstream of the site, at the junction of the River Martin and Blarney River. The FSU node for the River Martin is 19_765_5 and the FSU node for the Blarney River is 19_769_3. Catchment descriptors for each node were determined from the OPW FSU Spreadsheet, as outlined in Table 6-1.

Table 6-1: Catchment Descriptors

Catchment Descriptor	River Martin 19_765_5	Blarney River 19_769_3
Area (km^2)	63.458	24.652
BFIsoils	0.699	0.697
SAAR	1196.08	1138.18
FARL	1	0.973
DRAIND	1.058	0.798
S1085	10.504	13.622
ArtDrain2	0	0
URBEXT	0.0053	0.0062

Table 6-2: QMED Flood Estimates

Method	River Martin 19_765_5	Blarney River 19_769_3
FSU 7-variable	13.85	4.81
FSU2 7-variable	14.13	4.22
LEE CFRAM	**18.78**	**5.11**

The FSU Spreadsheet was also utilised to generate growth factors. Using a pooling group from the FSU Spreadsheet based on 11 gauging stations with Hydrological Similarity and the GLO distribution, the growth factor for the 1% AEP design flow is 1.827 for the River Martin and 2.036 for the Blarney River. In comparison, the Lee CFRAM used growth factor of 2.26 for the River Martin and 2.89 for the Blarney River. Review of the Lower Lee Flood Relief Scheme (LLFRS) hydrology report[3] estimated a growth factor of 2.62 for ungauged catchment in the study area. This was derived using the flood frequency curves from six gauged sites within the lower lee catchment area. Given the additional analysis completed for the LLFRS and the more conservative value, the growth factor of 2.62 was adopted for both watercourses for the FSU QMED values.

The results 1% AEP flood estimates are shown in Table 6-3 below, with the Lee CFRAM producing the largest design flows.

---

[3] Lower Lee (Cork City) Drainage Scheme (Flood Relief Scheme) Hydrology Report (2017)

Table 6-3: 1% AEP Flood Estimates

Method	River Martin	Blarney River
FSU 7-variable	36.29	12.60
FSU2 7-variable	37.02	11.06
LEE CFRAM	**42.50**	**14.78**

The analysis concludes that the Lee CFRAM flow estimates are the most conservative of the three methods reviewed. This indicates that the flow estimates used in the Lee CFRAM study are unlikely to underestimate the flows within the model, and consequently, the resulting flood extents are likely to be conservative as well.

[6.2] Hydraulic Model Review

[6.2.1] Topographic & Survey Review

The Lee CFRAM hydraulic model which covers the site and surrounding area used a 1D hydraulic model to represent the river channels and the floodplain, using extended river sections. This approach was deemed appropriate given the steep, primarily rural, U-shaped valleys.

The channel survey used in the model was collected in 2007. Where it was necessary to extend sections beyond the river channel survey extent, OPW LiDAR data was used to determine the ground elevations of the extended sections. An analysis of the developments within Blarney and the upper catchment confirms that minimal change has occurred within the floodplain that could potentially impact flow routes. Therefore, the survey data used in the model is still considered suitable.

A comparison was also conducted between the OPW LiDAR data and the topographic survey data collected within the site boundary. The results show that the topographic survey levels and LiDAR levels closely match (within 200mm), with greater differences noted in areas where on-site works have altered the ground levels (e.g., along the hardstanding ground from the former Blarney Park Hotel, demolished in 2012, and the raised rubble patch in the southeast corner) – refer to Figure 6-1.

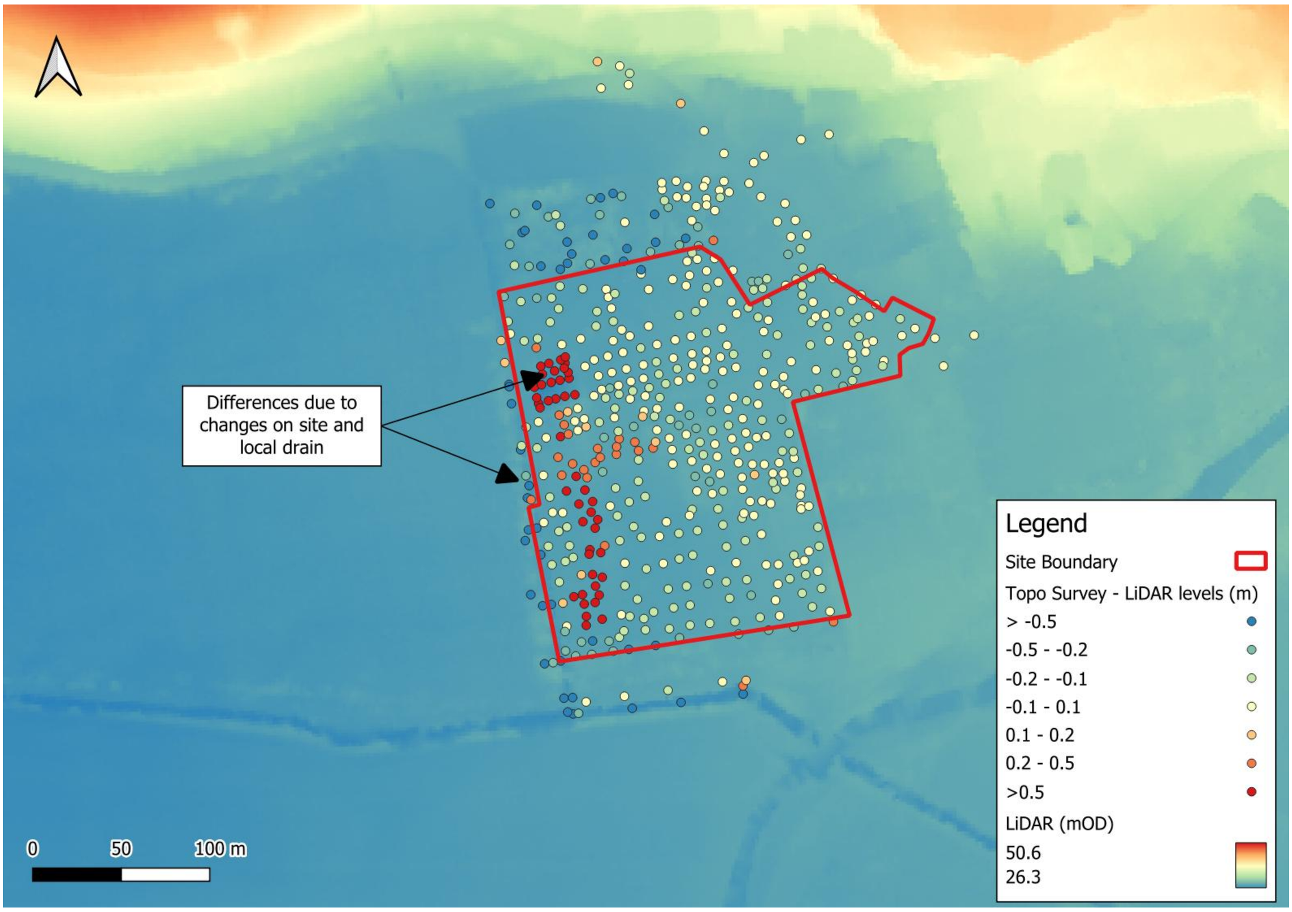

Figure 6-1: Topographic Survey V LiDAR Comparison

[6.2.2] River Channel Representation

The Lee CFRAM study focuses on the main hydrological features in the area and does not include smaller streams in the hydraulic model. This is apparent from review of the survey data and 1D model representation in the Blarney area. While the Blarney River and River Martin have been surveyed and modelled, there is a notable absence of the local stream along the southern boundary of the site from the 1D hydraulic model and from the river channel survey.

However, a review of the OPW LiDAR confirms that the watercourse is represented in the LiDAR data used to represent floodplain flows in the model, as depicted in Figure 6-1. This is reflected in the resulting CFRAM flood maps (Figure 4-8), which show flooding along the alignment of this watercourse.

Section [2.1] noted the presence of two drainage channels in close proximity to the site. While these channels have not been represented in the hydraulic model, the flood risk from these channel is considered a pluvial flood risk as discussed in Section [5.2], with mitigation measures discussed in the section below to ensure the risk from these channels remains low.

[6.2.3] Sensitivity Analysis

Sensitivity analysis was carried out on the hydraulic model as part of the study. The study concluded that the main factors affecting uncertainty on the River Martin and Blarney River was Flow and

Manning's n value. The confidence limits for the sensitivity analysis on the watercourses are -0.24m to 0.22m. These figures will be taken into consideration as part of the mitigation measures.

[6.3] Lee CFRAM Review Summary

A Stage 3 detailed assessment was carried out on the Lee CFRAM study to ensure it assesses the fluvial flood risk in sufficient detail. Based on the analysis provided, the Lee CFRAM Study provides the most conservative estimates of flows among the three hydrological estimation methods reviewed. Additionally, the review of the hydraulic model, topographic survey data, stream representation and sensitivity analysis confirms that the study's assumptions and data sources are appropriate for assessing flood risk for the proposed development site.

This quantitative evaluation demonstrates that the Lee CFRAM study is appropriate for use in this SSFRA.

[6.4] Proposed Mitigation Measures

[6.4.1] Finished Floor Levels

The proposed finished flood levels (FFLs) for the developments range from 30.38mOD to 31.16mOD. This places them above the 1% MRFS AEP flood event plus a minimum of 300mm freeboard (30.08mOD + 0.3m = **30.38mOD**). This also places the proposed developments above the 0.1% AEP MRFS flood level with a minimum of 200m freeboard.

[6.4.2] Surface Water Management

As surface water flooding has been identified as a potential flood risk in the surrounding area, the stormwater system should be designed to the relevant standards, to mitigate against pluvial flooding on the site and the risk of increase in runoff due to the changes at the site to a hardstanding area.

As per the Engineering Drainage Report: Surface water runoff will be managed through a combination of detention basins, permeable paving, tree pits/rain gardens and below-ground attenuation. These measures provide effective control of runoff rates and volumes while also offering improvements in surface water quality prior to discharge. Surface water from all roofed areas, roads, terraces and hardstanding areas will be collected via a dedicated surface water drainage network comprising gullies, drainage channels, downpipes and rainwater outlets. Runoff will be conveyed through the proposed SuDS features and attenuation measures prior to controlled discharge from the site. In addition, a petrol interceptor (NSBE010) is proposed prior to discharge to ensure hydrocarbons are removed from surface water flows.

As per Cork City Council recommendations, the allowable discharge rate from the site has been restricted to a reduced Qbar value of 2.0 l/s/ha. This corresponds to a total site discharge rate of 7.40 l/s which will be provided by a hydrobrake vortex control device installed on the last manhole prior to discharge offsite. The on-site attenuation storage has been designed to cater for the 1 in 100-year storm event plus a 20% climate change allowance.

The Engineering Infrastructure Report & Drainage Impact Assessment completed as part of this application presents the proposed mitigation measures to reduce to surface water flood risk to the site, including those mentioned above, and ensures there are no impacts to surrounding properties.

To further reduce the risk of surface water inundation, the FFL are raised 300mm above external hardstanding ground levels and where possible, ground levels on site slope away from access points to the buildings.

[6.4.3] Drainage Channel Maintenance

The local drainage channel along the western boundary will need to be periodically inspected to ensure there is no material build up. Any material, such as branches or debris, found in the channel will have to be removed to prevent blockage which could impair the flow of water. However, if the drainage channel were to overflow, it would spill into the field to the west which lies at a lower elevation, as is the case at present. Refer to Section [5.2] for further detail on this overland flow route.

[6.5] Emergency Access & Egress

Access and Egress for the site is via St. Ann's Road, which is shown to be at a low risk of flooding and hence, can be maintained during flood events.

[6.6] Residual Risk

Residual risks are the risks remaining after all risk avoidance, substitution and mitigation measures have been taken. The primary two residual risks identified at the site are:

- Surface Water Exceedance Event
- Overtopping of the Drainage Channel along the western boundary
- Overtopping of the Drainage Channel to the north of the site

If either of these events were to occur, the proposed FFLs are raised 300mm above surrounding hardstanding ground levels to prevent inundation. The ground levels within the site will direct any overland flows away from the building footprints and towards the open green space within the site boundary. The overall slope of the surrounding lands is to the west / southwest so any overland flow routes from the surrounding lands (i.e. the local drains) would be directed to the west rather than into the site. Section [5.2] discusses these overland flow routes in detail.

[6.7] Impacts on Surrounding Properties

From a fluvial perspective, the site is within Flood Zone C meaning there is a low risk of flooding. Therefore, there will be no impacts to surrounding properties as a result of the proposed development.

As mentioned in Section [6.4.2], the discharge rate from the site has been restricted to a reduced Qbar value of 2.0 l/s/ha. This will ensure there are no impacts to surrounding properties as a result of surface water runoff. Similarly, as the overland flow paths from surrounding lands are to the northwest, flow routes shall not be impacted as a result of the proposed development and surrounding properties will not be affected.

[7] Conclusion

A Flood Risk Assessment has been undertaken for the subject site and proposed development in Blarney, Co. Cork. The proposed development involves the construction of 138 no. residential units, a civic centre and all ancillary works.

The subject site lies within Flood Zones C as per the CFRAM flood maps. The development of a residential complex is classified as a highly vulnerable development to flooding.

A Stage 3 – Detailed Flood Risk Assessment was carried out on the Lee CFRAM study to ensure it assesses the fluvial flood risk in sufficient detail for use in this SSFRA. Based on the analysis provided, the Lee CFRAM Study provides the most conservative flow estimates among the three hydrological estimation methods reviewed. Additionally, the review of the hydraulic model, topographic survey data, stream representation and sensitivity analysis confirms that the study's assumptions and data sources are appropriate for assessing flood risk for the proposed development site. This quantitative evaluation demonstrates that the Lee CFRAM study is appropriate for use in this SSFRA.

The highly vulnerable development adopts the precautionary approach to setting of residential floor levels as noted in Section 5.16 of the FRM Guidelines and is robust to climate change scenarios. The proposed FFL of the developments range from 30.38mOD to 31.16mOD, which places the FFL above the 1% AEP MRFS flood level a minimum of 300mm freeboard. This also protects the development from the 0.1% AEP MRFS flood level with over 200mm freeboard.

Recommended mitigation measures to reduce residual risk of flooding on the proposed development include the appropriate setting of FFLs and the overall slope of hardstanding levels away from the buildings to reduce the risk of surface water inundation. These measures also reduce the residual risks to the site, such as during a surface water exceedance event.

There will be no fluvial impacts to surrounding properties as a result of the development as the site is within Flood Zone C and at a low risk of flooding. Mitigation measures on site will ensure there are no impacts to surrounding properties from pluvial sources through the restriction of the surface water discharge rate from the site.

This FRA demonstrates the appropriateness of the development and how it meets the requirements of The Planning System and Flood Risk Management, Guidelines for Planning Authorities (2009).

Appendix A – Proposed Development Layout

BLARNEY

Unit Description	Unit Type	Bed Space	Proposed Unit Area (sq.m.)	No. of Unit
4 bed semi-detached (with accessible GF bedroom)	A1/A1(m)	7	129.8	4
3 bed detached	B1	5	119.5	4
3 bed detached	C1	5	97.7	1
3 bed semi-detached / townhouse	D1/D1(m)	5	109.5	19
3 bed townhouse	D2/D2(m)	5	106.9	4
3 bed semi-detached / townhouse	E1/E2/E3/E4/E5	5	95.4/95.6	48
2 bed semi-detached / townhouse	F1/F1(m)/F2/F2(m)/F3/F4/F4(m)	4	82.0/84.7	33
2 bed townhouse	F5/F5(m)	4	80.3	4
2 bed bungalow	G1/G2	3	71.2	2
2 bed GF apartment (own-door access)	2AU	3	72.9	5
2 bed apartment	2BU	3	68.1	2
1 bed accessible GF apartment (own-door access)	1AU	2	49.6	5
1 bed apartment	1BU	2	52.3	6
1 bed apartment	1CU	2	53.1	1

4 bed	4	2.9%
3 bed	76	55.1%
2 bed	46	33.3%
1 bed	12	8.7%
houses	119	86.2%
duplex-apartments/later living units	19	13.8%

TOTAL NUMBER OF UNITS	**138**
SITE AREA	**3.7 HA**
DEVELOPABLE AREA	**3.0 HA**
DENSITY	**46 UNITS / HA**
OPEN SPACE	**Min. 12%**

KEY:

🟥 SITE BOUNDARY

Note
- Please refer to the landscape proposal prepared by CSR for public realm and open space information.
- Refer to accompanying plans prepared by MMOS for additional engineering details etc.

Note
- All units that have a minimum private amenity space depth of less than 8m **DO NOT** have rear windows that serve habitable rooms at first floor.

DO NOT SCALE. WORK TO FIGURED DIMENSIONS ONLY.
ALL EXISTING DIMENSIONS TO BE CHECKED ON SITE.
DRAWN ON AUTOCAD R2004 AT DEADY GAHAN ARCHITECTS LTD
LAYERS ON THIS DRAWING COMPLY WITH BS 1192: PART 5

PROPOSED ROOF PLAN A

SCALE 1:500 @ A1

date	rev	name	chk	note
06.03.26	P1	LM	EJG	ISSUE FOR PLANNING

DEADY GAHAN ARCHITECTS
EASTGATE VILLAGE, LITTLE ISLAND, CORK
T: 021 4355016 W:WWW.DGARCHITECTS.IE
EMAIL:INFO@DGARCHITECTS.IE

Project
PROPOSED MIXED-USE DEVELOPMENT AT
BLARNEY,
CO. CORK.

Drawing title
PROPOSED ROOF PLAN A

Scale	Drawn	Checked	Date
1:500 @ A1	JA	EJG	02.07.24
Project No.	**Drg. No.**		**Revision**
23063	23063/P/003A		P1

☐ Information \ Comments — Tender ☐
🟧 Planning — Construction ☐

Appendix B – Topographic Survey

HEAVY OVERGROWTH
GRASS
CL OF HEDGE
EP
CL OF SOD AND STONE DITCH
SAPLING TYP
GATE
CL OF TREES
EDGE OF TARMAC
GAS INSTALLATION
BOTTOM OF BANK
TOP OF BANK
LIMIT OF BUILDING
FLOWER BED
CONCRETE
CL OF HEDGE
TARMAC CAR PARK
GRASSED AREA
SAPLING
HEDGE
CONC POST & PANEL FENCE
BLOCK WALL
DWELLING PARAPET=33.3
DWELLING PARAPET=33.7
DWELLING PARAPET=33.7
TIMBER FENCE
PALISADE FENCE
SHED
DRIVEWAY
DRIPLINE
CONC POST & CHAINLINK FENCE
CAR PARKING
BUILDING RIDGE=38.7 EAVES=33.1
BUILDING RIDGE=37.1 EAVES=33.1
BUILDING RIDGE=36.0 EAVES=33.5
BUILDING RIDGE=35.9 EAVES=33.5
KERB
PLANTER
BARRIER
BEECH HEDGE
BLOCK WALL
BRICK PAVING FOOTPATH
UTIL MARKERS
STONE WALL
STONE WALL 900mm HIGH
TARMAC ROAD
TOWN SQUARE
DISUSED POLE
O/H ESB
DWELLINGS RIDGE=36.1 EAVES=33.7
SAPLING TYP
WIRE RUNNING BETWEEN TREES
CL OF DITCH
ESB BOX
SPEED RAMP
TRANSVERSE DRAIN
STEPS
APPROX LIMIT OF BUILDING
CONCRETE FLOOR SLAB
SWITCH ROOM
ESB SUB STATION
GRASS
LARGE MATURE TREES
CL OF SOD AND STONE DITCH
CRUSHING UNIT
SAPLINGS
MH: CL=29.13 IL=28.04
MH: CL=29.73
MH: CL=29.83
MH: CL=29.87
MH: CL=29.93
MH: CL=29.82
MH: CL=29.84
MH: CL=29.82
MH: CL=29.74
MH: CL=29.93
MH: CL=29.66
MH: CL=29.60
MH: CL=29.93
MH: CL=30.33
TARMAC
RUBBLE
DISUSED PLAY AREAS
GRASSED AREA
METAL POST & CHAINLINK FENCE
CONCRETE POST & CHAINLINK FENCE
CL OF TREES
TREED AREA
DRY DRAIN
UNPAVED TRACK
DRIPLINE
BANK OF STREAM
MH CL=29.75 CL=27.24
GATE
METAL PALISADE FENCE
INVERT OF PIPE 27.33m
29.0
29.25
29.50
29.75
30.00
30.25
= 560600
= 560800
= 560900

Appendix C – Historical Flood Reports

Past Flood Event Local Area Summary Report

OPW Oifig na nOibreacha Poiblí Office of Public Works

Report Produced: **10/3/2026 11:30**

This Past Flood Event Summary Report summarises all past flood events within 2.5 kilometres of the map centre.

This report has been downloaded from www.floodinfo.ie (the **"Website"**). The users should take account of the restrictions and limitations relating to the content and use of the Website that are explained in the Terms and Conditions. It is a condition of use of the Website that you agree to be bound by the disclaimer and other terms and conditions set out on the Website and to the privacy policy on the Website.

Map Legend

- ⚠ Single Flood Event
- ⚠ Recurring Flood Event
- ▦ Past Flood Event Extents
- ▤ Drainage Districts Benefited Lands*
- ▨ Land Commission Benefited Lands*
- ▥ Arterial Drainage Schemes Benefited Lands*

* Important: These maps do not indicate flood hazard or flood extent. Their purpose and scope is explained on Floodinfo.ie

2 km

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8 Results

	Name (Flood_ID)	Start Date	Event Location
1. ⚠	Martin River Blarney Shamrock Terrace Nov 2000 (ID-5239)	05/11/2000	Approximate Point
	Additional Information: Reports (1) Press Archive (0)		
2. ⚠	Flooding at Blarney Castle on 23/02/2021 (ID-14064)	23/02/2021	Approximate Point
	Additional Information: Reports (0) Press Archive (0)		
3. ⚠	Shournagh Cork August 1986 (ID-1344)	04/08/1986	Approximate Point
	Additional Information: Reports (1) Press Archive (0)		
4. ⚠	Shournagh/Martin Riverview estate Blarney Feb 1990 (ID-1476)	06/02/1990	Approximate Point
	Additional Information: Reports (5) Press Archive (0)		
5. ⚠	Martin Blarney Village Cork Feb 1990 (ID-1477)	06/02/1990	Approximate Point
	Additional Information: Reports (4) Press Archive (0)		
6 ⚠	N20 at Dairygold, Co. Cork recurring (ID-3614)	n/a	Approximate Point
	Additional Information: Reports (2) Press Archive (0)		

2 km
© National Mapping Division of Tailte Éireann

	Name (Flood_ID)	Start Date	Event Location
7. ⚠	Martin River Waterloo Junction Blarney Nov 2000 (ID-1525)	05/11/2000	Approximate Point
	Additional Information: Reports (3) Press Archive (0)		
8. ⚠	Shournagh Lee Nov 2000 (ID-1349)	28/11/2000	Approximate Point
	Additional Information: Reports (1) Press Archive (0)		

MINUTES OF MEETING

Reference:	**P4D403A – F310 – 010 – 004 – 2592**	**Page 1 of 2**
Project No.:	**P4D403A**	
Project Title:	**OPW Flood Hazard Mapping – Phase 1**	
Purpose of Meeting:	**Data Collection – Cork County Council - South Cork –Blarney Area**	
Participating:	**District Supervisor**	**South Cork – Blarney Area**
	Search Manager	**ESBI**
Venue:	**Blarney**	
Date of Meeting:	**26/04/2005**	
Copies to:	**File**	
Compiled by:	**Search Manager**	
Status:	**Draft**	
Approved for ESBI:		
Date:		

Meeting with District Supervisor for Blarney 26/04/05

The District Supervisor outlined areas that are or were prone to flooding. The locations were marked up on digital versions of discovery series maps and labelled appropriately.

Where available photos were provided of locations subject to flooding.

1. Road flooding on N20 at Dairygold factory – recurring. Flood ID 3614
2. River Martin flooding in Riverview Estate – road and land flooding including properties in the housing estate –February 1990. Flood ID 1476
3. River Martin flooding in Blarney village – February 1990. Flood ID 1477
4. Road and land flooding – Putlands Bridge to Waterloo Junction as a result of the River Martin flood flows – November 2000. Flood ID 1525 and 5232.
5. Land and property flooding adjacent to N20 road Flood ID 1509
6. Road flooding on R579 Kilmartin upper to vicinity of Barrahavrin – runoff from steep ground floods road and deposited spoil and rock. – recurring. Flood ID 3607
7. Annagannihy North to Musheera Road flooding as a result of runoff in periods of heavy rain from steep ground. – recurring. Flood ID 3608
8. Road flooding over stretch between Knocknagoun To Rylane due to runoff from steep ground – recurring. Flood ID 3609
9. Flooding on road at Coakley's Bridge as a result of river Delehinagh overbank flow. Road surface washed away – recurring. Flood ID 3610
10. Junction of R579 and R617 Cloghroe, Co. Cork Road flooding from the Owennagearagh River – recurring. Flood ID 3612, 1510
11. Lisladeen Cross Roads flooding from river Owennagearagh– recurring. Flood ID 3613

Comhairle Chontae Chorcai

Cork County Council

Annabelle,
Mallow,
Co. Cork.

Tel. No: (022) 21123
Fax No: (022) 21983

Web: http://www.corkcoco.com/

Engineer's Dept. (South)
Fax No. 021 4342098

A/County Engineer,
Floor 11.

6 November, 2000.

RE/ Flooding

Extensive flooding occurred over the weekend 5/11/2000. Most affected areas were:-

1. Carrigaline Area

Douglas, Grange Road, Clarkes Hill, Togher, Scairt Cross, Five Mile Bridge, Ballygarvan, Ballinhassig, Ballea Road, Carrigaline.
No house evacuated but several flooded including School, Togher.

2. Blarney Area

Blarney – Shamrock Terrace – houses flash flooded.
Shournagh River, Donoghmore.
No houses evacuated.

3. Ballincollig

N71 impassable at Viaduct.
Kilumney-Aheria Road – road damaged.
Clash Road impassable.
No houses evacuated.

4. Bandon Area

Little flooding.
Mart area flooded. (Public house flooded).
Wall – Back Quay collapsed.
All roads passable.
No houses evacuated.

5. **Glanmire Area**

   N8 closed south of Watergrasshill and Annacartin Bridge.
   Meadowbrook Estate.

6. **Kinsale Area**

   Belgooly Village.
   Jagoes Mills.

7. **Macroom Area**

   N22 west of Macroom flooded.
   Coachford Road.
   Millstreet Road.
   A house flooded at Dunískly.

8. **Midleton Area**

   WaterRock, Bilburry Road, Bloomfield West.

9. **Youghal Area**

   Localised flooding. No major problems.

In general gangs were out over the weekend in all areas.

No reports of evacuations. Fire Brigades called out in several areas.

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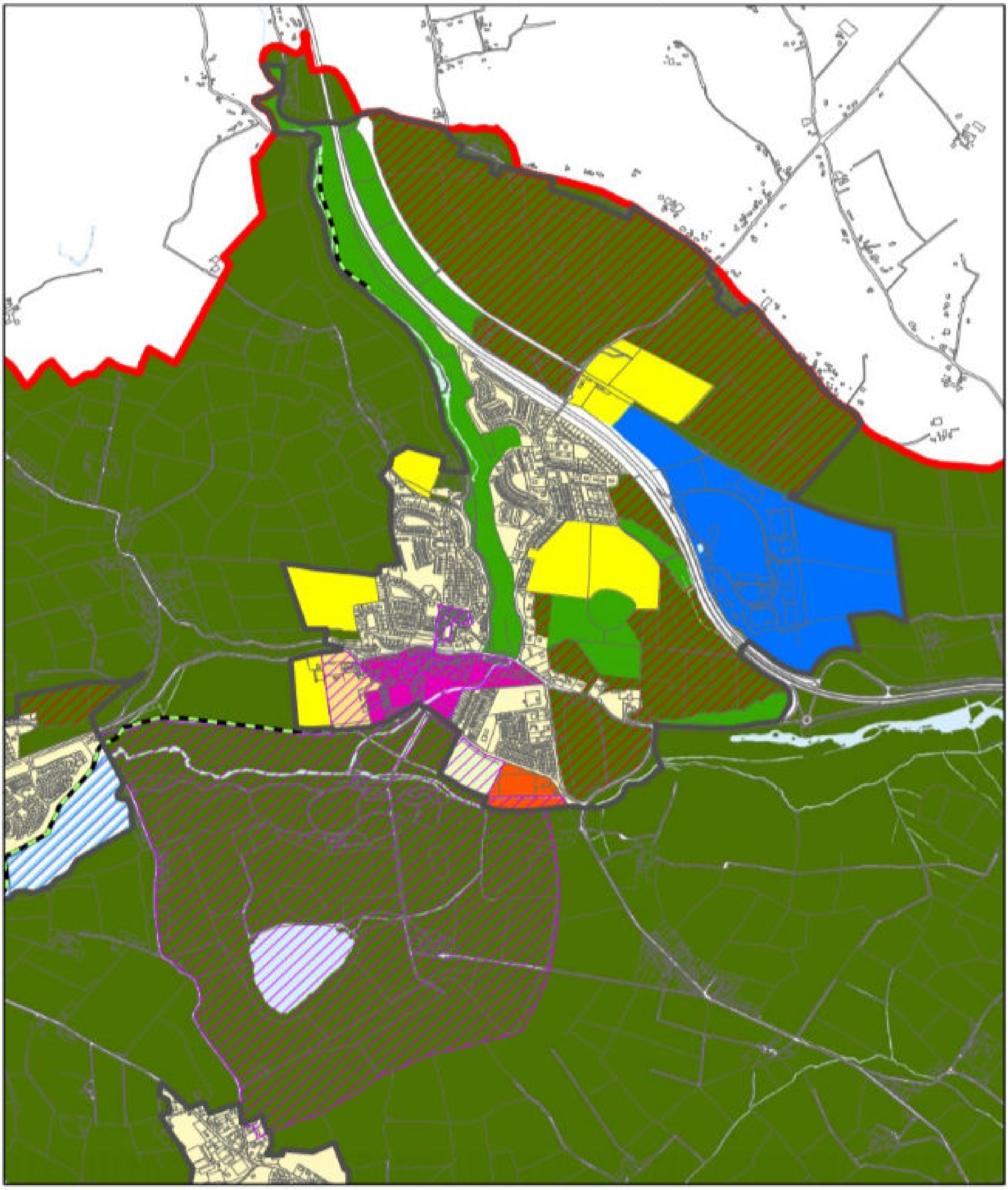
A/DIVISIONAL ENGINEER

Appendix D – Land Use Zoning Map

MAP 11 Blarney and Hinterland

Cork City Development Plan 2022 - 202



Base map© OSI; all rights reserved.

- - - Walkways & Cycleways
▨ Architectural Conservation Areas
▨ Long Term Strategic Development Lands
■ ZO 01, Sustainable Residential Neighbourhoods
■ ZO 02, New Residential Neighbourhoods
■ ZO 03, Long-term Strategic Regeneration
■ ZO 04, Mixed Use Development
■ ZO 06, Urban Town Centre
■ ZO 09, Light Industry and Related Uses
■ ZO 15, Public Open Space
■ ZO 16, Sports Grounds and Facilities
▨ ZO 19, Rivers and Water Bodies Protection
■ ZO 20, City Hinterland