

# Preliminary Site Specific Flood Risk Assessment

Greenhills, Embassy Office Park, Kill, Naas, Co. Kildare



June 2021

# Preliminary Site Specific Flood Risk Assessment

Client: Hayes Higgins Partnership

Location: Greenhills, Embassy Office Park, Kill, Naas, Co. Kildare

Date: 06<sup>th</sup> June 2021

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## 1. Introduction

IE Consulting was requested by Hayes Higgins Partnership to undertake a Preliminary Site Specific Flood Risk Assessment (SSFRA) in support of a planning application for a proposed development site at Greenhills, Embassy Office Park, Kill, Naas, Co. Kildare. It is proposed to construct 33 No. residential housing units, access road and all associated site works.

The purpose of this SSFRA is to assess the potential flood risk to the proposed development site and to assess the impact the development as proposed may or may not have on the hydrological regime of the area.

Quoted ground levels or estimated flood levels relate to Ordnance Datum (Malin) unless stated otherwise.

This flood risk assessment study has been undertaken in consideration of the following guidance document:-

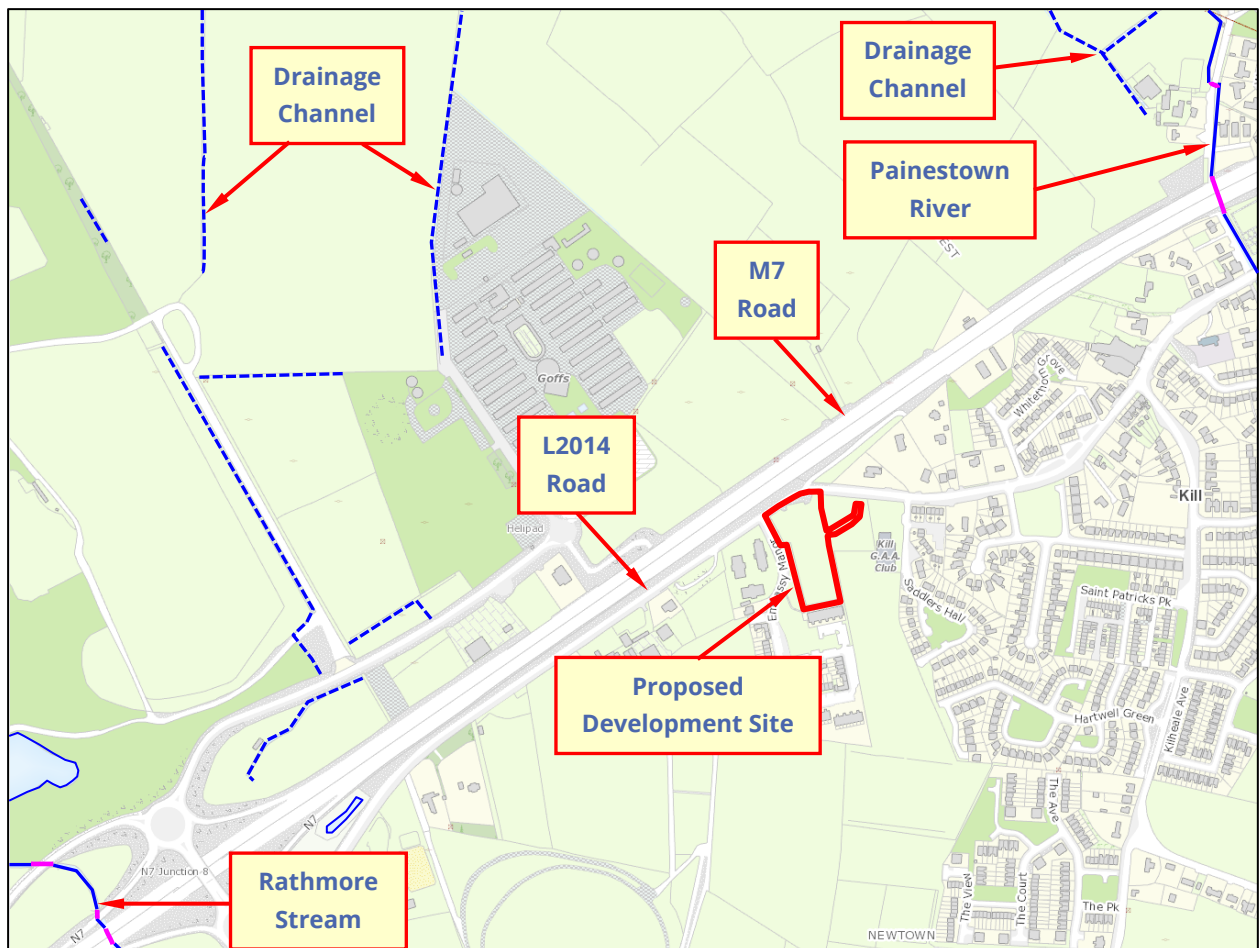
*The Planning System and Flood Risk Management – Guidelines for Planning Authorities’ DOEHLG 2009.*

## 2. Proposed Site Description

### 2.1. General

The proposed development site is located at Greenhills, Embassy Office Park, Kill, Naas, Co. Kildare. The site is bounded to the north by the N7 and L2014 roads, to the west by the Embassy Office Park, to the south by the Embassy Manor Housing Estate and to the east by the Kill GAA Club. The total area of the proposed development site is approximately 1.51 hectares.

The location of the proposed development site is illustrated on *Figure 1* below and shown on Drawing Number IE2304-001-A in *Appendix A*.



**Figure 1 - Site Location**

## 2.2. Existing Topography Levels at Site

The proposed development site slopes gently to moderately in a south to north direction at an average gradient of approximately 1.299% (1 in 77).

Existing ground elevations range from approximately 95.911m OD (Malin) at the southern boundary of the site to 94.000m OD (Malin) at the northern boundary of the site.

## 2.3. Local Hydrology, Landuse & Existing Drainage

The most immediate hydrological features in the vicinity of the proposed development site are the Painestown River, which is located 662m beyond the eastern boundary of the site and the Rathmore Stream, which is located 1098m beyond the western boundary of the site as shown in *Figure 1* above.

Utilising the OPW Flood Studies Update (FSU) Portal software, the catchment area of the Painestown River was delineated and found to be approximately 7.374km<sup>2</sup> to a point downstream of the site boundary. An assessment of the catchment area indicates a predominantly rural catchment with the urban fraction accounting for 15.05% in the upstream catchment area.

The catchment area of the Rathmore Stream was delineated and found to be approximately 15.63km<sup>2</sup> to a point downstream of the site boundary. An assessment of the catchment area indicates a predominantly rural catchment with the urban fraction accounting for 0.87% in the upstream catchment area.

In addition, a number of surface drainage channels are mapped in the vicinity of the site.

### 3. Initial Flood Risk Assessment

The flood risk assessment for the proposed development site is undertaken in three principal stages, these being 'Step 1 – Screening', 'Step 2 – Scoping' and 'Step 3 – Assessing'.

#### 3.1. Possible Flooding Mechanisms

Table 1 below summarises the possible flooding mechanisms in consideration of the site:

Source/Pathway	Significant?	Comment/Reason
Tidal/Coastal	No	The site is not located within a coastal or tidally influenced region.
Fluvial	Possible	The Painestown River and the Rathmore Stream are located 662m and 1098m beyond the eastern and western boundaries of the site respectively.
Pluvial (urban drainage)	No	There is no significant urban drainage or water supply infrastructure located in the vicinity of the proposed development site.
Pluvial (overland flow)	No	The site is not surrounded by significantly elevated lands and does not provide an important surface water discharge point to adjacent lands.
Blockage	No	There are no significant or restrictive hydraulic structures located in the vicinity of the site.
Groundwater	No	There are no significant springs or groundwater discharges mapped or recorded in the immediate vicinity of the site.

**Table 1: Flooding Mechanisms**

The primary potential flood risk to the proposed development site can be attributed to an extreme fluvial flood event in the Painestown River and/or the Rathmore Stream located 662m and 1098m beyond the eastern and western boundaries of the site respectively. In accordance with 'The Planning System and Flood Risk Management – Guidelines for Planning Authorities - DOEHLG 2009' the potential flood risk to the proposed development site is analysed in the subsequent 'Screening Assessment' and "Scoping Assessment" section of this study report.

## 4. Screening Assessment

The purpose of the screening assessment is to establish the level of flooding risk that may or may not exist for a particular site and to collate and assess existing current or historical information and data which may indicate the level or extent of any flood risk.

If there is a potential flood risk issue then the flood risk assessment procedure should move to 'Step 2 - Scoping Assessment' or if no potential flood risk is identified from the screening stage then the overall flood risk assessment can end at 'Step 1'.

The following information and data was collated as part of the flood risk screening assessment for the proposed development site.

### 4.1. OPW/EPA/Local Authority Hydrometric Data

Existing sources of OPW, EPA and local authority hydrometric data were investigated. As illustrated in *Figure 2* below, this assessment has determined that there are eight hydrometric gauging stations located in the general vicinity of the proposed development site.





**Figure 2 - Hydrometric Gauging Stations**

Station 9016 is located on the Arthurstown Stream approximately 2.24km south-east of the site boundary and is entered into the Register of Hydrometric Stations in Ireland as an inactive water level/flow recorder station, with hydrometric data available from 1981 to 1983.

Station 9027 is located on the Hartwell River approximately 2.11km south-east of the site boundary and is entered into the Register of Hydrometric Stations in Ireland as an active water level/flow recorder station, with hydrometric data available from 2001 to present.

Station 9029 is located on the Kill Stream approximately 2.33km south-east-east of the site boundary and is entered into the Register of Hydrometric Stations in Ireland as an inactive staff gauge station with flow data available from 1982 to 1998.

Station 9030 is located on the Hartwell River approximately 0.83km south-west of the site boundary and is entered into the Register of Hydrometric Stations in Ireland as an inactive staff gauge station with flow data available from 1993 to 1998.

Station 9036 is located on the Morell River approximately 2.26km north-west of the site boundary and is entered into the Register of Hydrometric Stations in Ireland as an active water level recorder station, with hydrometric data available from 1996 to 1998.

Station 9044 is located on the Morell River approximately 1.93km west of the site boundary and is entered into the Register of Hydrometric Stations in Ireland as an active water level/flow recorder station, with hydrometric data available from 2009 to present.

Station 9046 is located on the Painestown River approximately 1.74km north-east of the site boundary and is entered into the Register of Hydrometric Stations in Ireland as an inactive staff gauge station with flow data available from 2000 to 2003.

Station 9047 is located on the Painestown River approximately 0.62km north-north-east of the site boundary and is entered into the Register of Hydrometric Stations in Ireland as an active water level/flow recorder station, with hydrometric data available from 2009 to present.

If required, hydrometric data from these stations may be suitable to assist in the prediction of extreme flood volumes and flood levels at the location of the proposed development site.

## 4.2. OPW PFRA Indicative Flood Mapping

Preliminary Flood Risk Assessment (PFRA) Mapping for Ireland was produced by the OPW in 2011. OPW PFRA flood map number 2019/MAP/220/A illustrates indicative flood zones within this area of County Kildare.

*Figure 3* below illustrates an extract from the above indicative flood map in the vicinity of the proposed development site.

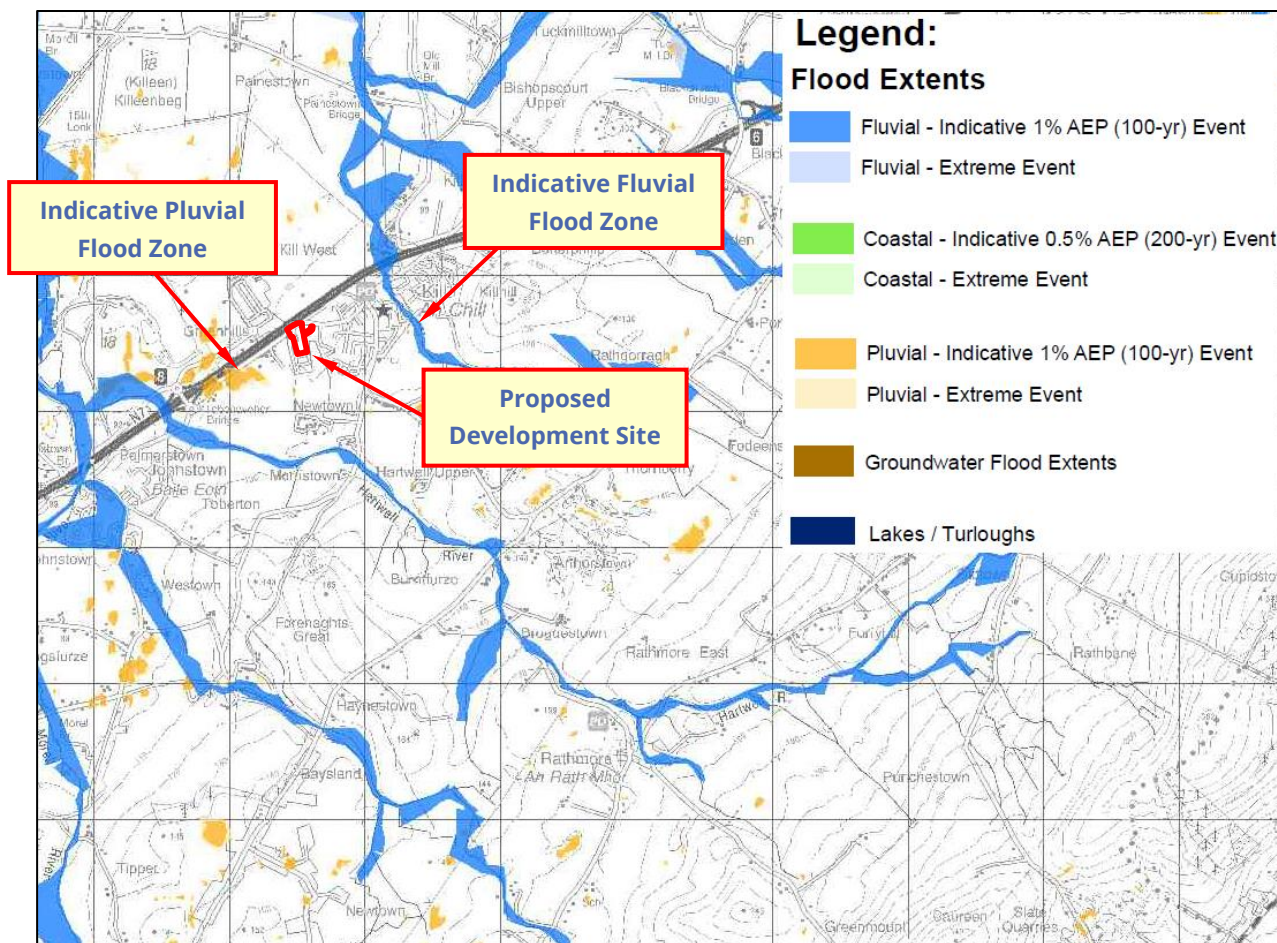


Figure 3 - OPW PFRA Mapping

The PFRA flood mapping indicates no areas of indicative fluvial, pluvial or groundwater flood zones within or in the immediate vicinity of the boundary of the proposed development site.

It should be noted that the indicated extent of flooding illustrated on these maps was developed using a low resolution digital terrain model (DTM) and illustrated flood extents are intended to be indicative only. The flood extents mapped on the PFRA maps are not intended to be used on a site specific basis.

#### 4.3. OPW Flood Info - Past Flood Events

The OPW Flood Info Website ([www.floodinfo.ie](http://www.floodinfo.ie)) was consulted in relation to available historical or anecdotal information on any flooding incidences or occurrences in the vicinity of the proposed development site. *Figure 4* below illustrates mapping from the OPW Flood Info website in the vicinity of the site, which identifies three flood events recorded within 2.5km of the proposed development site.

## Past Flood Event Local Area Summary Report



OPW

Cúig na nOibríochtaí Poiblí  
Office of Public Works

Report Produced: 5/6/2021 15:11

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](http://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.



Figure 4 - OPW Flood Info Maps

The flood events in the general vicinity of the proposed development site refer to the following:

- Historical flooding problem in the town of Johnstown related to the Morell River 1.95km west of the site.
- Flooding in November 2000 downstream of the Painestown Bridge as illustrated in *Figure 4a* below.
- Flooding in Kill village downstream of Old Kill Bridge. The river backs up during high flows at the carriageway culvert. Overtopping river banks downstream of the dual carriageway at a small bridge which provides access to Whyndon Court, flooding Straffan Lane.

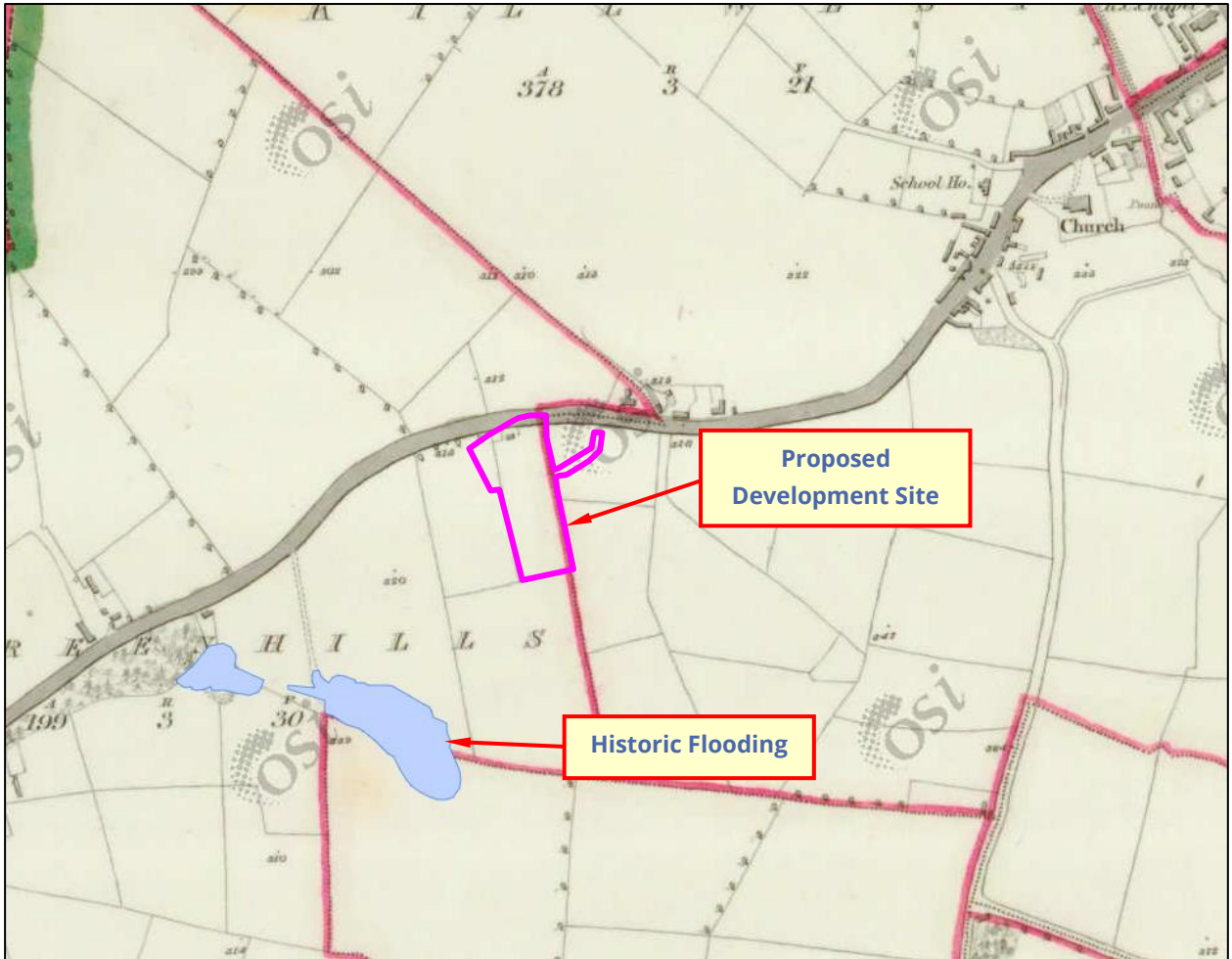


**Figure 5a - Downstream of Painestown Bridge during Flooding (8<sup>th</sup> November 2000)**

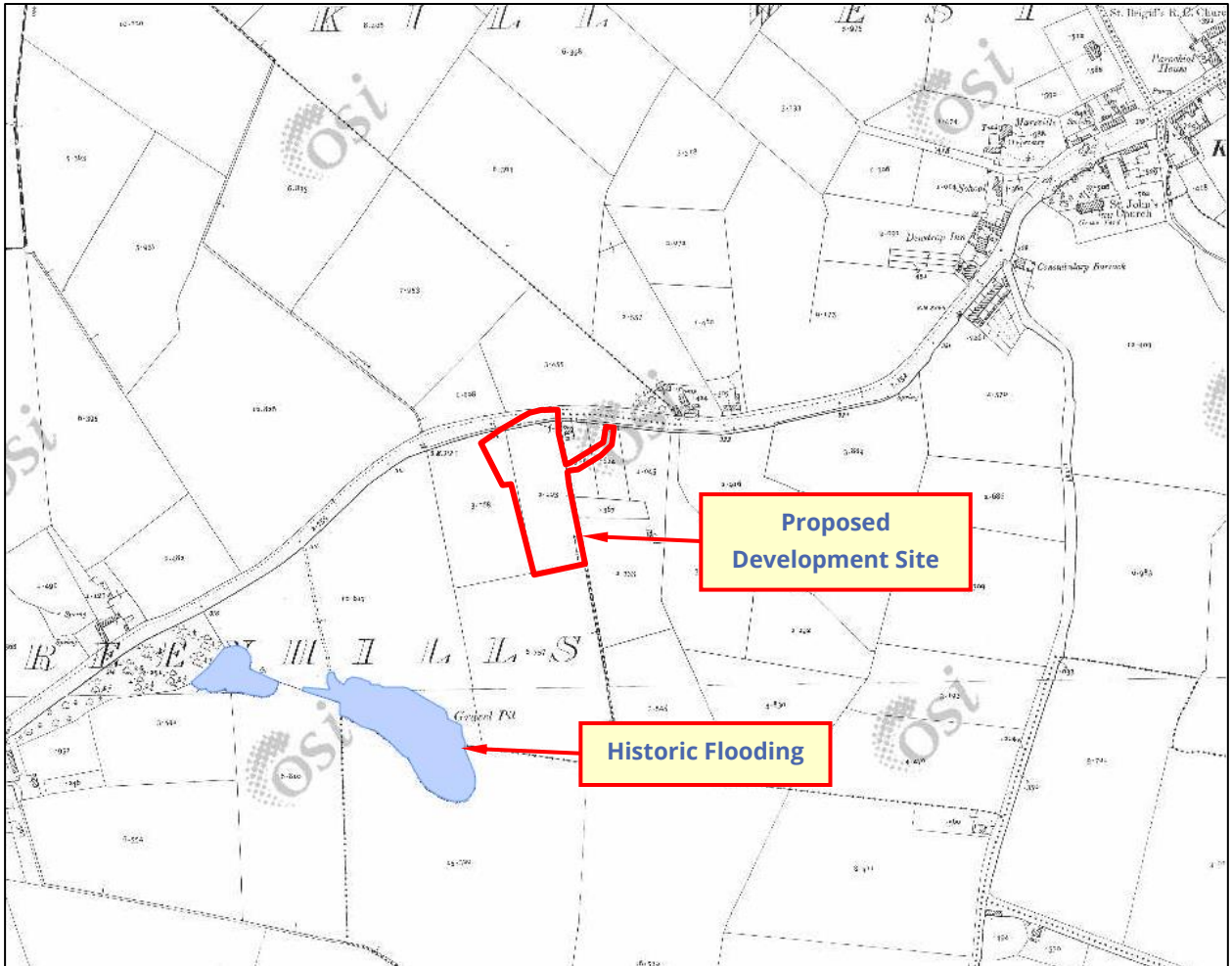
The recorded, mapped and anecdotal information provided by the Floodinfo.ie resource does not contain any data or information to indicate that the above flood events impacted the area of the proposed development site.

#### 4.4. Ordnance Survey Historic Mapping

Available historic mapping for the area was consulted, as this can provide evidence of historical flooding incidences or occurrences. The maps that were consulted were the historical 6-inch maps (pre-1900), and the historic 25-inch map series. *Figure 6* and *Figure 7* below show the historic mapping for the area of the proposed development site.



**Figure 6 - Historic 6 Inch Mapping**



**Figure 7 - Historic 25 Inch Mapping**

The historic 6 inch and 25 inch mapping does not indicate any historical or anecdotal instances of flooding within or adjacent to the boundary of the proposed development site.

#### 4.5. Subsoil Mapping

The alluvial deposit maps of the Geological Survey of Ireland (GSI) were consulted to assess the extent of any alluvial deposits in the vicinity of the proposed development site. Alluvial deposits can be an indicator of areas that have been subject to flooding in the recent geological past.

*Figure 8* below illustrates the sub-soils mapping for the general area of the site.



**Figure 8 - GSI Subsoil Mapping**

Figure 8 above indicates that the proposed development site is almost entirely underlain by Made Ground with a small area underlain by Carboniferous Limestone sands and gravels. There are no alluvial deposits mapped within or adjacent to the boundary of the site.

#### 4.6. Eastern CFRAM Study

This area of County Kildare has not been included as an Area of Further Assessment as part of the Eastern CFRAM Study.



## 4.7. Morell River Flood Management Scheme

The Morell River Flood Management Scheme commenced in August 2020 by the OPW and is intended to provide optimum flood relief within the Morell River catchment with minimal environmental impact.

Approximately 9000m of new sloped flood embankments will be constructed as part of the scheme, plus approximately 480m of flood walls to direct flood waters from high risk areas, realignment of two stream watercourses and up to 11 culvert alterations and upgrades.

The Morell River Flood Management Scheme maps indicate that the site of the proposed development does not fall within a flood zone.

A full copy of the Morell River Flood Management Scheme benefiting area maps is presented in *Appendix B*.

## 4.8. Climate Change

The [www.myplan.ie](http://www.myplan.ie) resource was utilised to assess the potential mid-range and high end future climate change scenario fluvial flood extents in the general location of the site of the proposed development.

*Figure 10* below illustrates the predictive mid-range future climate change scenario fluvial flood extents in the general location of the site of the proposed development.



**Figure 9 - Mid Range Future Climate Change Scenario Mapping**

Figure 11 below illustrates the predictive high end future climate change scenario fluvial flood extents in the general location of the site of the proposed development.



**Figure 10 - High End Range Future Climate Change Scenario Mapping**

Figure 10 and Figure 11 above indicate that the proposed development site does not fall within a mapped mid-range future or high end future 1% AEP flood zone.

## 5. Scoping Assessment

The purpose of the scoping stage is to identify possible flood risks and to implement the necessary level of detail and assessment to assess these possible risks, and to ensure these can be adequately addressed in the flood risk assessment. The scoping exercise should also identify that sufficient quantitative information is already available to complete a flood risk assessment appropriate to the scale and nature of the development proposed.

In consideration of the information collated as part of the screening exercise, and the availability of other information and data specific to the proposed development site, it is considered that sufficient quantitative information to complete an appropriate flood risk assessment can be derived from the information collated as part of the screening exercise alone.

The information and data presented in the above screening assessment indicates that the primary and direct fluvial, pluvial and groundwater flood risk to the site of the proposed development is LOW. The area of the proposed development site does not falls within an indicative, predictive, historic or anecdotal fluvial, pluvial or groundwater flood zone.

The development as proposed is not expected to result in an adverse impact to the existing hydrological regime of the area or increase flood risk elsewhere.

## 6. Development in the Context of the Guidelines

In the context of the 'Planning System and Flood Risk Management Guidelines, DOEHLG, 2009' three flood zones are designated in consideration of flood risk to a particular development site.

Flood Zone 'A' – where the probability of flooding from rivers and watercourses is the highest (greater than 1% or 1 in 100 year for river and watercourse flooding and 0.5% or 1 on 200 for coastal or tidal flooding).

Flood Zone 'B' – where the probability of flooding from rivers and watercourses is moderate (between 0.1% or 1 in 1000 year for river and watercourse flooding and 0.5% or 1 on 200 for coastal or tidal flooding).

Flood Zone 'C' – where the probability of flooding from rivers and watercourses is low or negligible (less than 0.1% of 1 in 1000 year for both river and watercourse and coastal flooding). Flood Zone 'C' covers all areas that are not in Zones 'A' or 'B'.

The 'Planning System and Flood Risk Management Guidelines' list the planning implications for each flood zone, as summarised below:-

Zone A – High Probability of Flooding. Most types of development would not be considered in this zone. Development in this zone should be only be considered in exceptional circumstances, such as in city and town centres, or in the case of essential infrastructure that cannot be located elsewhere, and where the 'Planning System and Flood Risk Management Guidelines' justification test has been applied. Only water-compatible development, such as docks and marinas, dockside activities that require a waterside location, amenity open space and outdoor sports and reaction would be considered appropriate in this zone.

Zone B – Moderate Probability of Flooding. Highly vulnerable development such as hospitals, residential care homes, Garda, fire and ambulance stations, dwelling houses, strategic transport and essential utilities infrastructure would generally be considered inappropriate in this zone, unless the requirements of the justification test can be met. Less vulnerable development such as retail, commercial and industrial uses and recreational facilities might be considered appropriate in this zone. In general however, less vulnerable development should only be considered in this zone if adequate lands or sites are not available in Zone 'C' and subject to a flood risk assessment to the appropriate level of detail to demonstrate that flood risk to the development can be adequately managed and that development in this zone will not adversely affect adjacent lands and properties.

Zone C – Low to Negligible Probability of Flooding. Development in this zone is appropriate from a flood risk perspective. Developments in this zone are generally not considered at risk of fluvial flooding and would not adversely affect adjacent lands and properties from a flood risk perspective.

In the context of the 'Planning System and Flood Risk Management Guidelines, DOEHLG, 2009' the output and findings of this Site Specific Flood Risk Assessment indicate that the proposed site falls within Flood Zone 'C'.

In accordance with the 'Planning System & Flood Risk Management Guidelines, DOEGLG, 2009' the development as proposed is therefore not subject to the requirements of The Justification Test.

## 7. Summary Conclusions & Recommendations

In consideration of the findings of this Site Specific Flood Risk Assessment and analysis the following conclusions are made in respect of the proposed development site:

- *A Site Specific Flood Risk (SSFRA) assessment, appropriate to the type and scale of development proposed and in accordance with 'The Planning System and Flood Risk Management Guidelines – DoEHLG-2009' has been undertaken.*
- *The area of the proposed development site has been screened, scoped and assessed for flood risk in accordance with the above guidelines.*
- *The screening assessment undertaken as part of this SSFRA indicates that the site is not at risk of primary and direct fluvial, pluvial or groundwater flooding.*
- *In consideration of the findings of this Site Specific Flood Risk Assessment, and in the context of 'The Planning System & Flood Risk Management Guidelines – 2009' the site of the proposed development site falls within Flood Zone 'C'.*
- *Overall, the flood risk to the site of the proposed development site is considered to be LOW. The development as proposed is not expected to result in an adverse impact to the existing hydrological regime of the area or increase flood risk elsewhere and is therefore considered to be appropriate from a flood risk perspective.*

# Appendices

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# Appendix A. Drawings

IE2304-001-A      Site Location



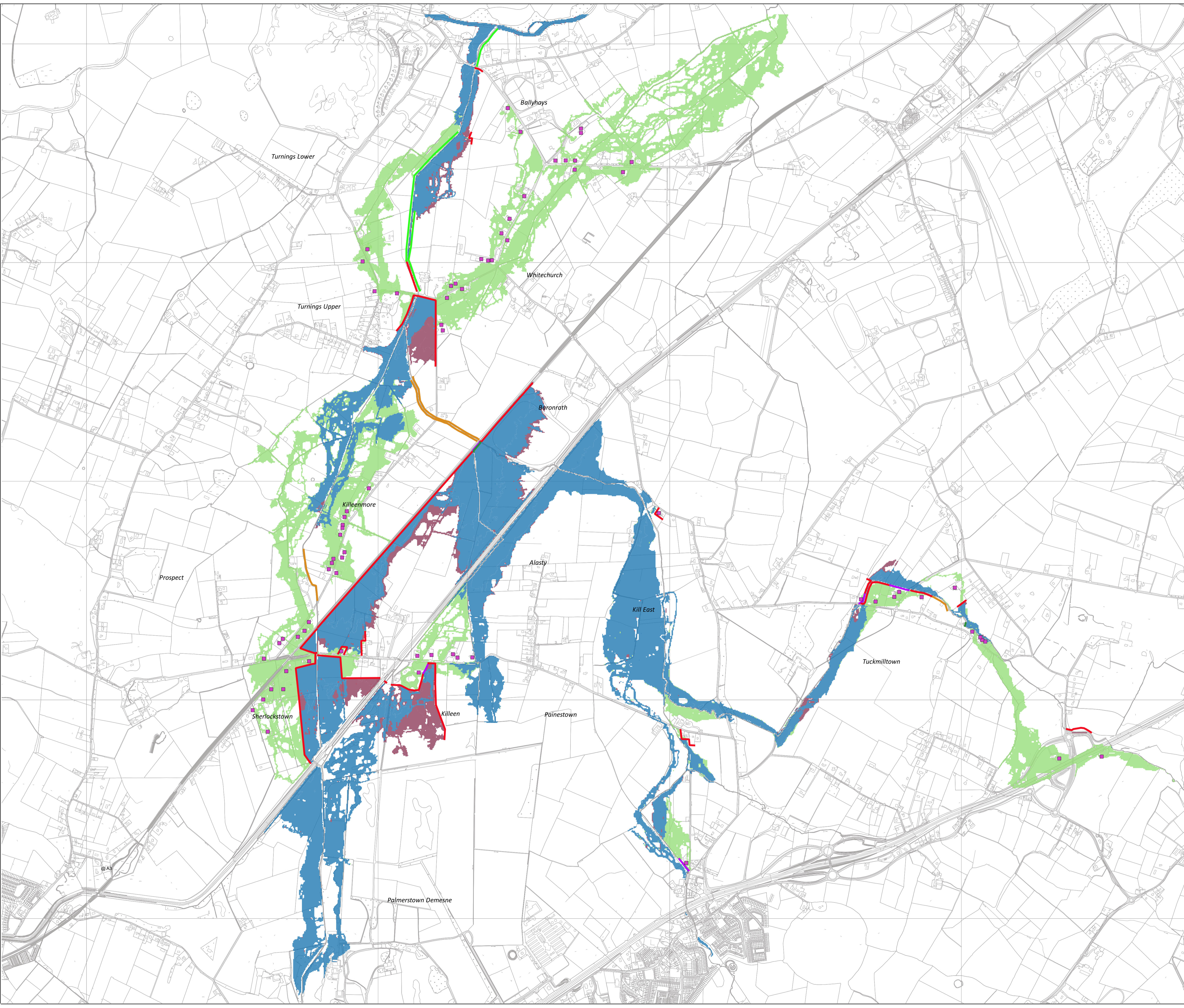
**SITE LOCATION**

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Project Title:	PRELIMINARY FLOOD RISK ASSESSMENT				
Project Address:	GREENHILLS, KILL, NAAS, CO. KILDARE				
Client:	HAYES HIGGINS PARTNERSHIP				
Drg. Title:	SITE LOCATION MAP				
Dwg. Scale:	Date:	Dwg.No:	Job No:	Revision:	Dwg.By:
1:50,000	06/06/21	IE2304-001	IE2304	A	LMC

# Appendix B. Morell River Flood Management Scheme Mapping



**Legend**

- 1% AEP - Pre & Post Scheme Floodplain
- 1% AEP - Post Scheme - Benefiting Area
- 1% AEP - Post Scheme - New Flooding
- Watercourses
- Properties Currently at Risk
- Proposed Wall
- Existing OPW Embankments
- Existing Landowner Embankment (Potential Upgrade)
- Existing Landowner (No Upgrade)
- Proposed Embankments
- Stream Diversion



**Project**

**Morrell River FMS**

**Title**

**Protected Properties Highlighted**

Figure 1.12

RPS

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**Issue Details**

<b>Drawn:</b>	CD	<b>Project No.:</b>	MDW0575
<b>Checked:</b>	MH	<b>File Ref:</b>	
<b>Approved:</b>	PM		MDW0575QG1159
<b>Scale:</b>	1: 24,000 @ A3 1:12,000 @ A1	<b>Map Projection:</b>	Irish National Grid (ING)
<b>Date:</b>	10/08/2017		

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