

Kilkenny County Council

Feasibility Stage Site Specific Flood Risk Assessment

'Site A' - 18 Upper Bridge Street, Callan, Co. Kilkenny



September 2023

Feasibility Stage Site Specific Flood Risk Assessment

Client: Kilkenny County Council

Location: 'Site A' - 18 Upper Bridge Street, Callan, Co. Kilkenny

Date: 5th September 2023

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Document Control

PROJECT NUMBER: IE2770		DOCUMENT REF: IE2770_Report_5909			
2.0	ISSUE-01	RM	LMc	PMS	15-09-2023
1.0	DRAFT-01	RM	LMc	PMS	11-09-2023
Revision	Purpose Description	Originated	Checked	Reviewed	Date

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1. Introduction

IE Consulting was requested by Kilkenny County Council to undertake a Feasibility Stage Site-Specific Flood Risk Assessment (SSFRA) in support of a potential Part 8 planning application for a proposed development at 18 Upper Bridge Street, Callan, Co. Kilkenny.

An initial assessment study undertaken by Kilkenny County Council indicates that this site may be suitable for the provision of a new mews house to the rear of the property onto Clodeen Lane.

The purpose of this Feasibility Stage SSFRA is to assess the potential flood risk to the site of the proposed development, to assess the impact that the development as proposed may or may not have on the hydrological regime of the area and, in terms of potential flood risk, to advise on the suitability of the site for the development as proposed.

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

This feasibility stage 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 site of the proposed development is located at 18, Upper Bridge Street, Callan, Co. Kilkenny (formerly known as 'Powers'). The site is bounded to the north and south by existing properties, to the west by Upper Bridge Street and to the east by Clodeen Lane. The total area of the site of the proposed development is approximately 0.042 hectares.

The location of the site of the proposed development is illustrated on *Figure 1* below and is shown on *Drawing Number IE2770-SA-001-A, Appendix A*.



Figure 1 – Site Location

2.2. Existing Topography Levels at Site

The finished floor level of the existing property within the boundary of the site is constructed to a level of approximately 63.38m OD (Malin).

The undeveloped open space area to the rear of the property slopes moderately in a west to east direction at an average gradient of approximately 10.9% (1 in 9.2).

Existing ground elevations within the undeveloped open space area range from approximately 63.86m OD (Malin) adjacent to the eastern façade of the existing property to 62.50 OD (Malin) adjacent to the eastern boundary of the site.

2.3. Local Hydrology, Landuse & Existing Drainage

The most immediate and significant hydrological feature in the vicinity of the site of the proposed development is the King's River which flows in a west to east direction approximately 12m beyond the northern boundary of the site.

The catchment area of the King's River was delineated and found to be approximately 203.143 km² to a point downstream of the site. An assessment of the King's River upstream catchment area indicates that the catchment is predominantly rural in nature with the urban fraction accounting for approximately 0.22 % of the total catchment area.

3. Initial Flood Risk Assessment

The flood risk assessment for the site of the proposed development 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	Yes	The King's River is located approximately 12m beyond the northern boundary of the site.
Pluvial (urban drainage)	No	There is no major or significant drainage or water supply infrastructure located in the vicinity of the 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	Possible	There is a road bridge located on the King's River approximately 20m beyond the northern boundary 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 site of the proposed development can be attributed to an extreme fluvial flood event in the King's River located beyond the northern boundary of the site.

Potential secondary and residual flood risk can be attributed to potential blockage of the road bridge on the King's River located approximately 20m beyond the northern boundary of the site.

In accordance with 'The Planning System and Flood Risk Management – Guidelines for Planning Authorities - DOEHLG 2009' the potential flood risk to the site of the proposed development 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 were collated as part of the flood risk screening assessment for the site of the proposed development.

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 there is one hydrometric gauging station located in the general vicinity of the site of the proposed development.

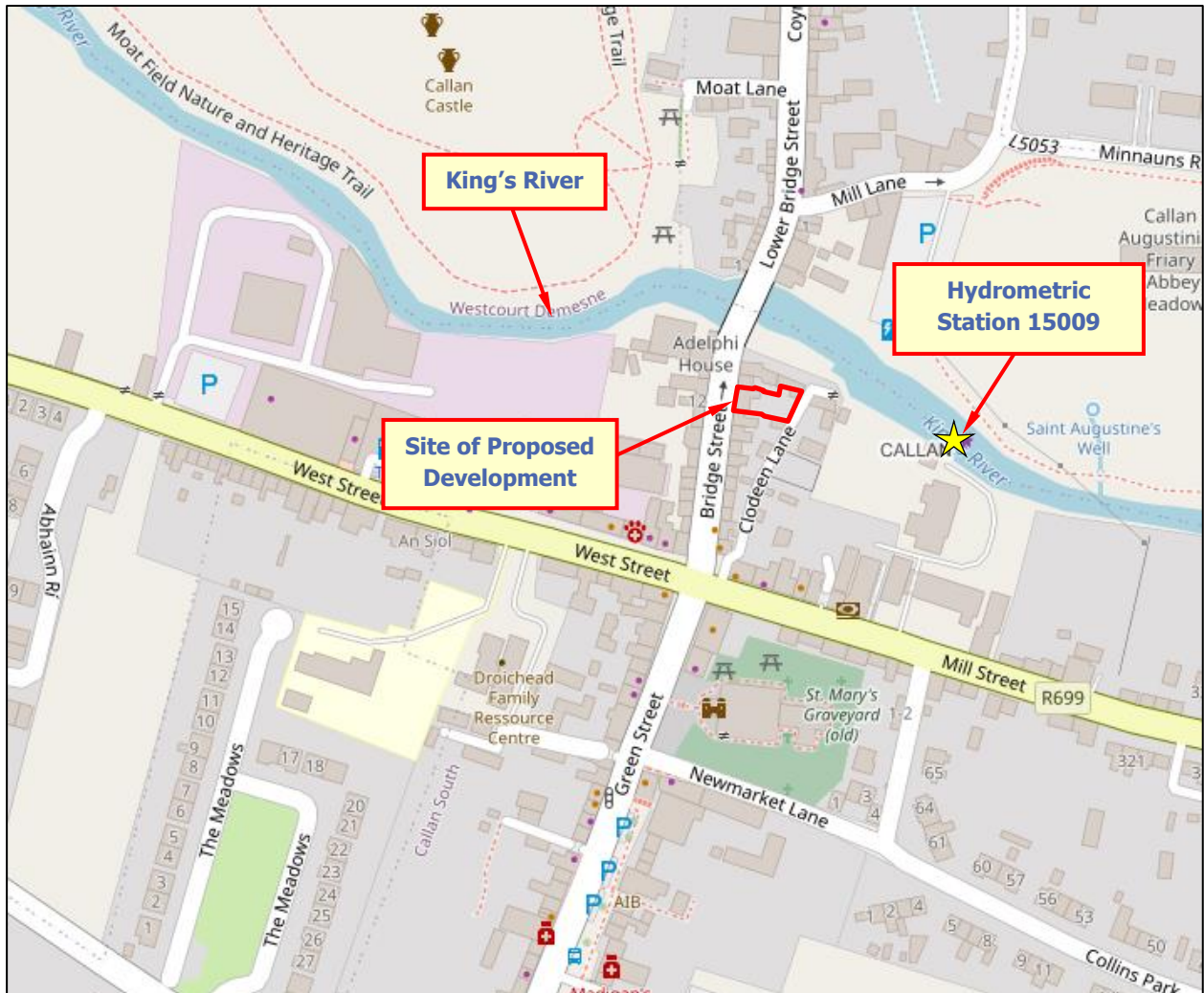


Figure 2 - Hydrometric Gauging Station

Hydrometric station 15009 is located on the King's River approximately 77m downstream of the site of the proposed development.

The hydrometric data from gauging station 15009 was examined to assess the suitability of the data to assist in the prediction of extreme flood flows and levels in the vicinity of the site. Hydrometric data for this station is available from 30th September 1962 to the present day. If required, the data from this gauging station may be suitable for the determination of flood levels in the general vicinity of the site of the proposed development.

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/121/A illustrates indicative flood zones within this area of County Kilkenny.

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

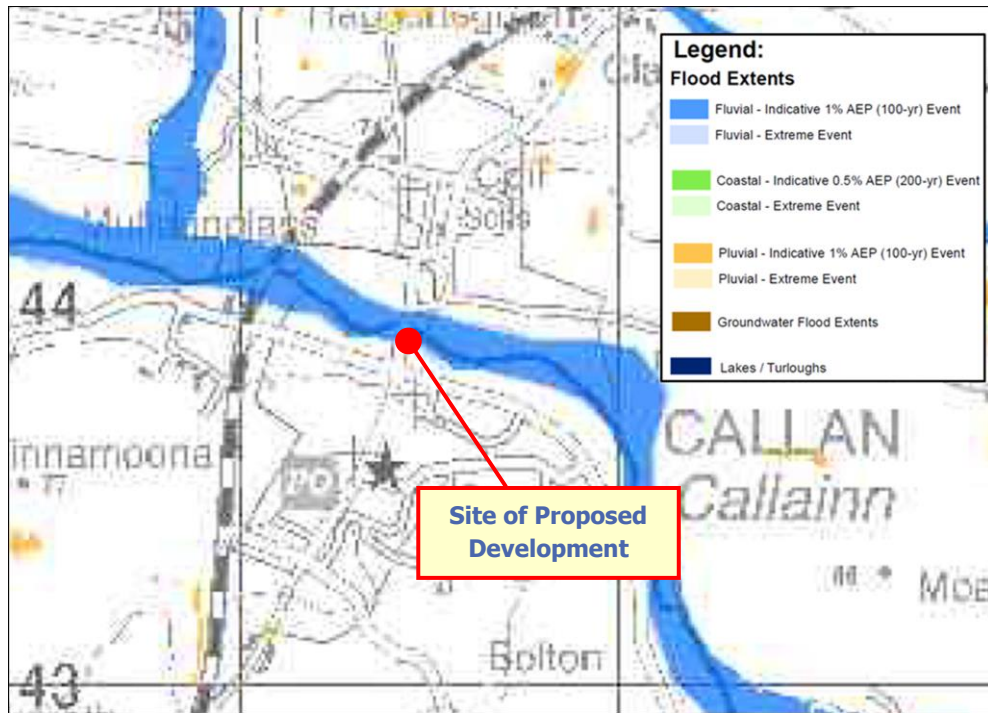


Figure 3 - OPW PFRA Mapping

Figure 4 below illustrates the PFRA indicative flood zones from Figure 3 overlaid onto higher resolution background mapping.

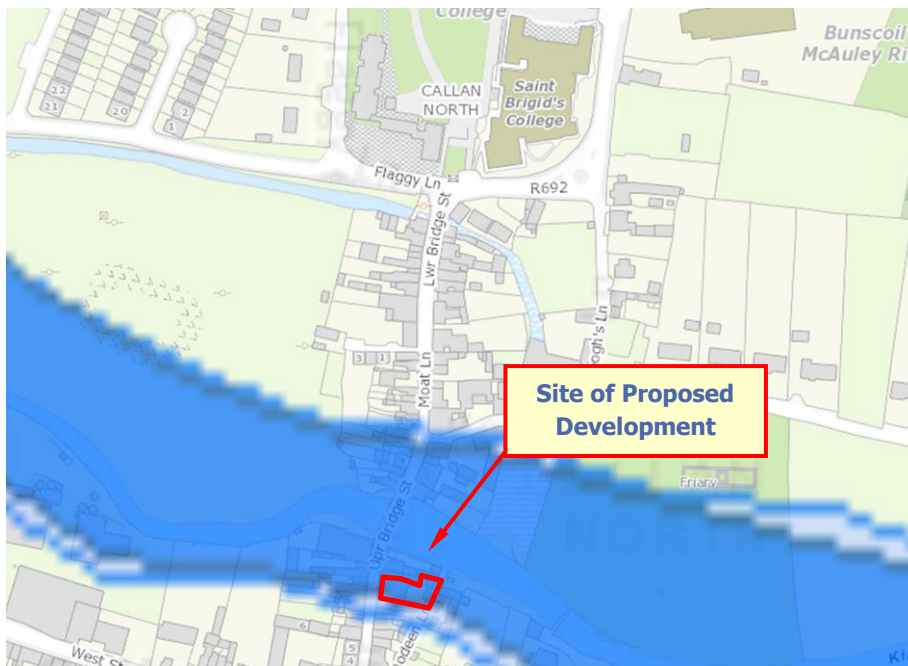


Figure 4 - OPW PFRA Mapping

Figure 3 and Figure 4 above indicate that the site of the proposed development falls within an indicative fluvial flood zone. The site does not fall within an indicative pluvial or groundwater flood zone.

It should be noted that the 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) was consulted in relation to available historical or anecdotal information on any flooding incidences or occurrences recorded in the vicinity of the site of the proposed development. Figure 5 below illustrates mapping from the Flood Info website in the vicinity of the site.

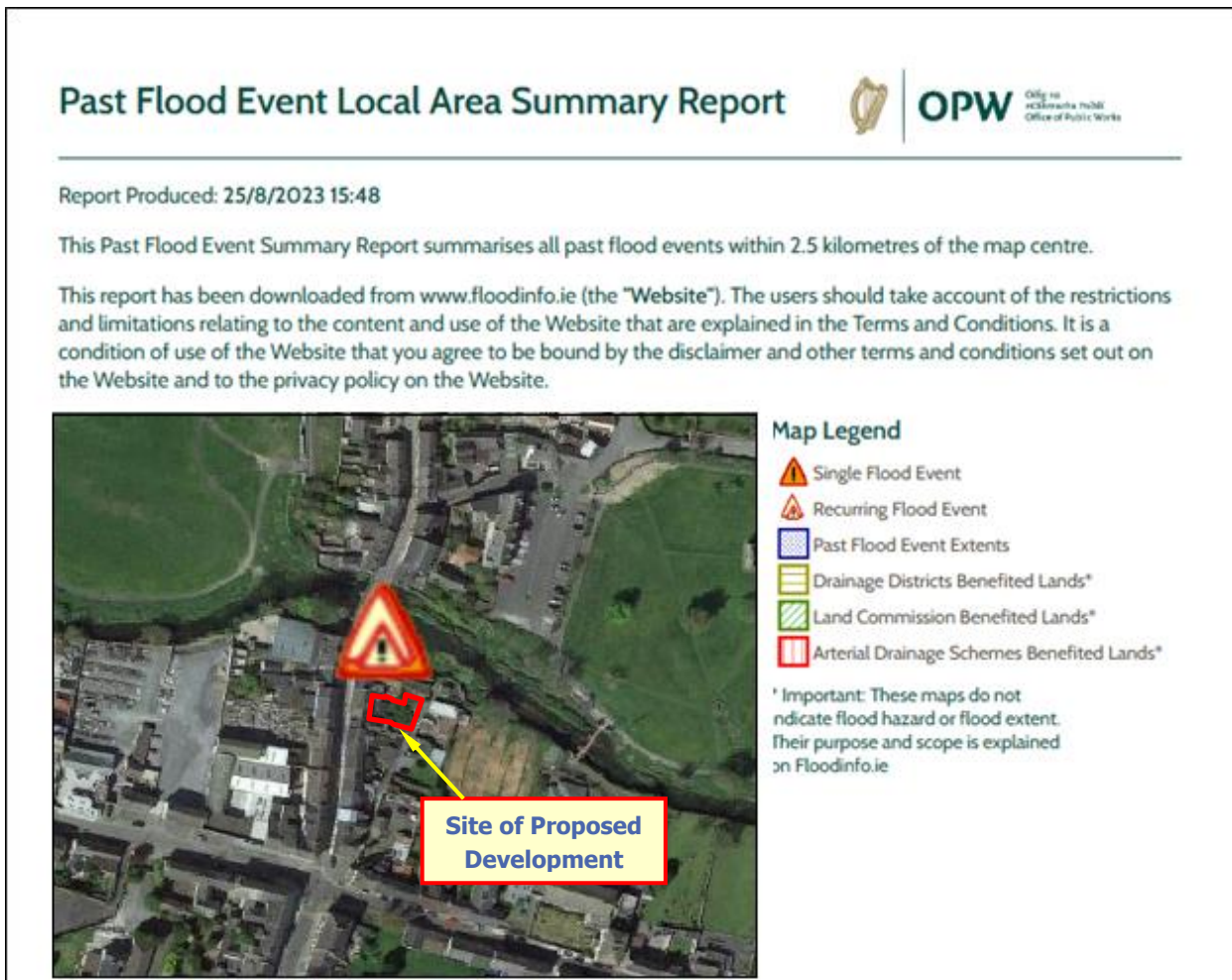


Figure 5 - OPW Flood Info Records

Figure 5 above indicates that there is a recorded recurring and single flood event located in the general vicinity of the site of the proposed development. These flood points refer to the following flood events:

- ID-2817 Flooding at Callan Town on 16/03/1947 originating from the Kings River
- ID-247 Recurring flooding in Callan Town originating from the Kings River

There is no specific recorded or anecdotal information or data to suggest that the above recurring and single flood events have impacted the area of the site of the proposed development.

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 site of the proposed development.



Figure 6 - Historic 6 Inch Mapping

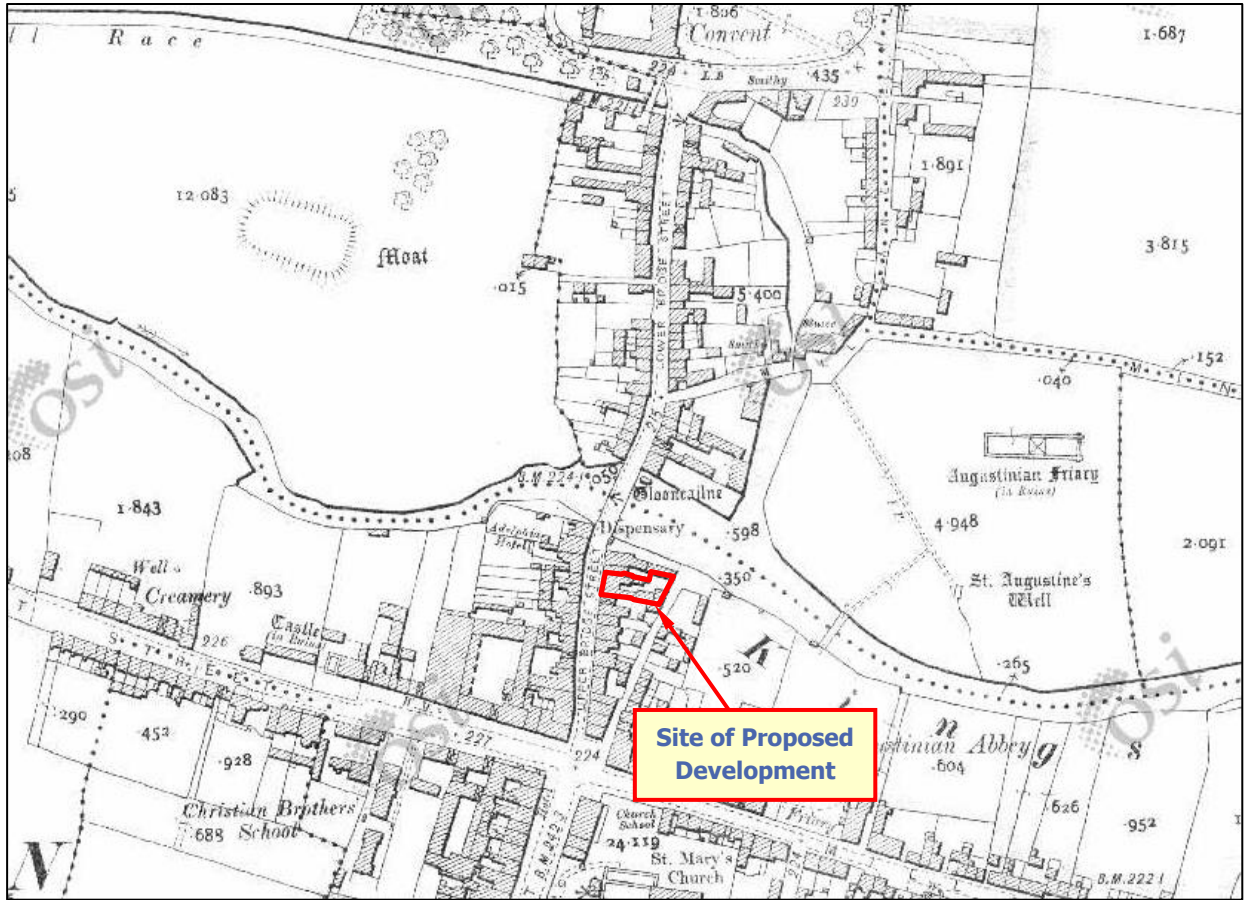


Figure 7 - Historic 25 Inch Mapping

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 site of the proposed development.

4.5. Geological Survey of Ireland 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 site of the proposed development. 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.

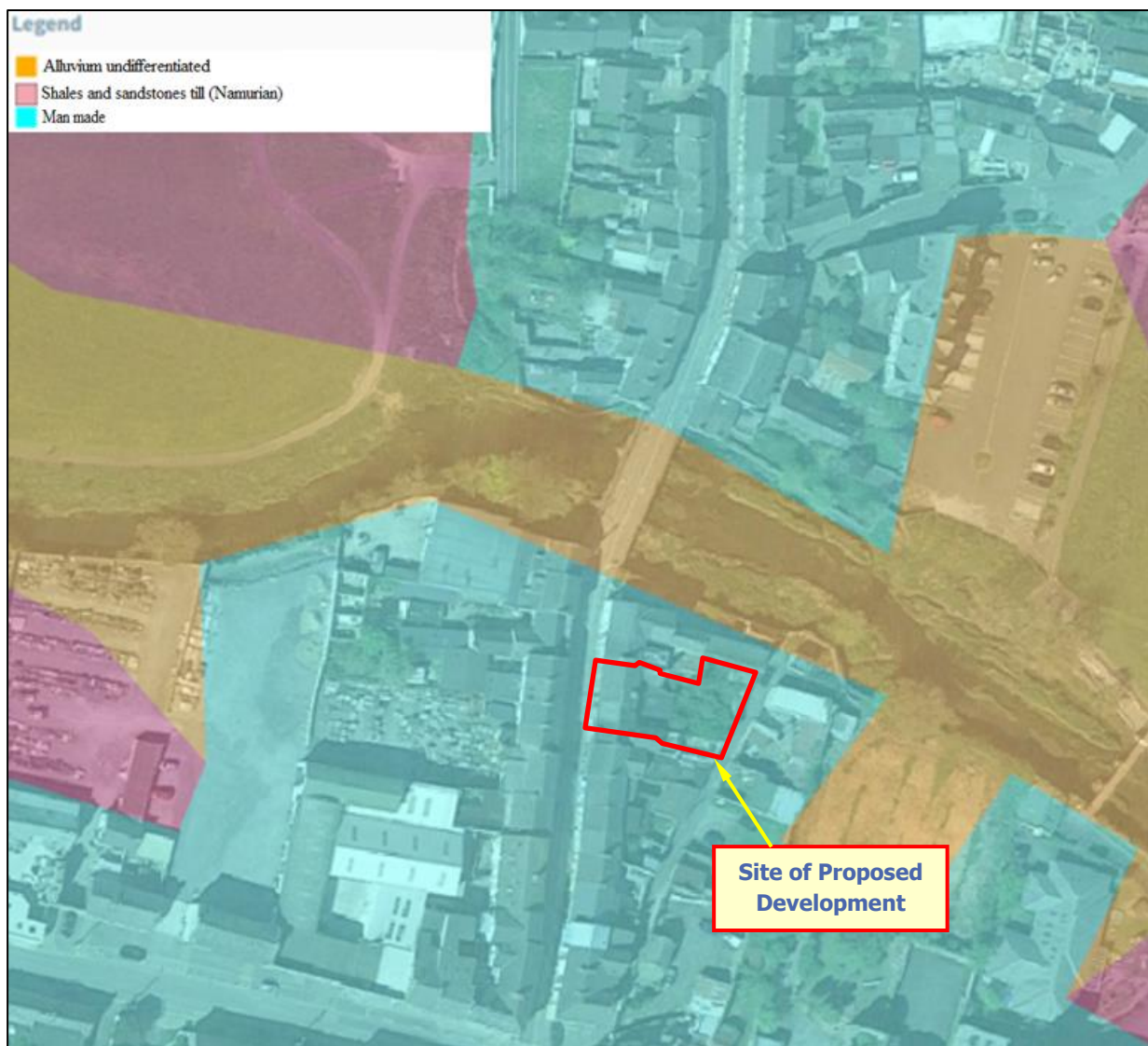


Figure 8 - GSI Subsoil Mapping

Figure 8 above indicates that the site is entirely underlain by Made Ground. Alluvium deposits are mapped close to the northern boundary of the site, however these do not encroach the site boundary.

4.6. Geological Survey of Ireland Groundwater Flood Mapping

Historic and Predictive Groundwater Mapping for Ireland was prepared by the GSI Department of Communication, Climate Action, and Environment in collaboration with Trinity College Dublin and the Institute of Technology Carlow.

Figure 9 below illustrates an extract from the above groundwater flood mapping in the vicinity of the site of the proposed development.

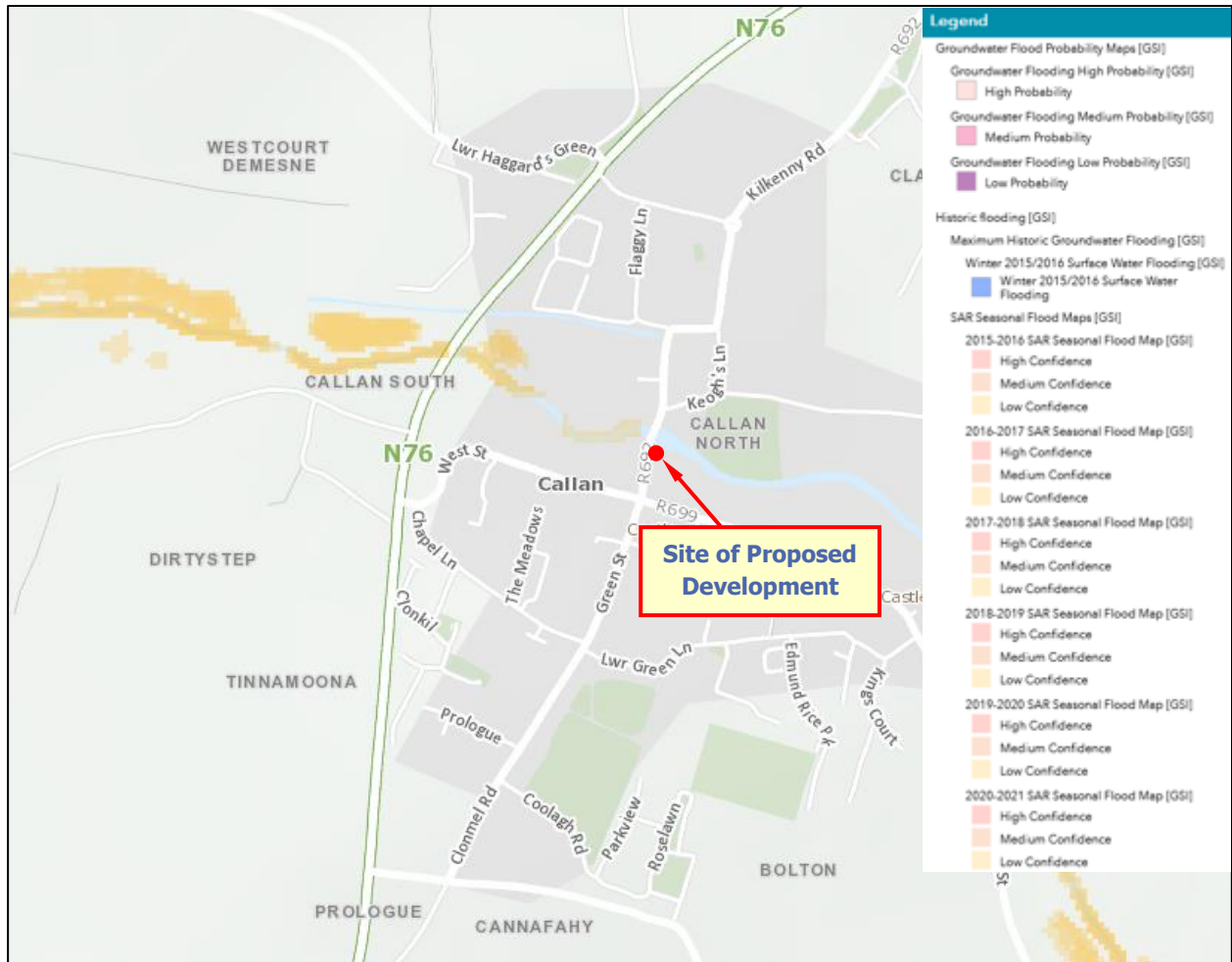


Figure 9 - GSI Groundwater Flood Mapping

The above GSi Groundwater Mapping indicates no areas of predictive or historical groundwater or surface water flooding located at or in the immediate vicinity of the site.

4.7. South Eastern CFRAM Study

The South Eastern Catchment Flood Risk & Management Study (CFRAMS) has been undertaken by the OPW and the final version of the flood maps were issued in July 2016. Flood risk extent and depth maps for further assessment areas within Callan have also been produced.

OPW CFRAMS predictive fluvial flood map number O15CAL_EXFCD_F0_02 illustrates predictive extreme present day scenario fluvial flood extent zones associated with King's River in the vicinity of the site of the proposed development.

Figure 10 below (extracted from CFRAMS flood maps O15CAL_EXFCD_F0_02) illustrates the predictive extreme present day scenario 10% AEP (1 in 10 year), 1% AEP (1 in 100 year) and 0.1% AEP (1 in 1000 year) flood extents in the vicinity of the site.

A full copy of OPW CFRAMS flood extent map O15CAL_EXFCD_F0_02 is presented in *Appendix B*.

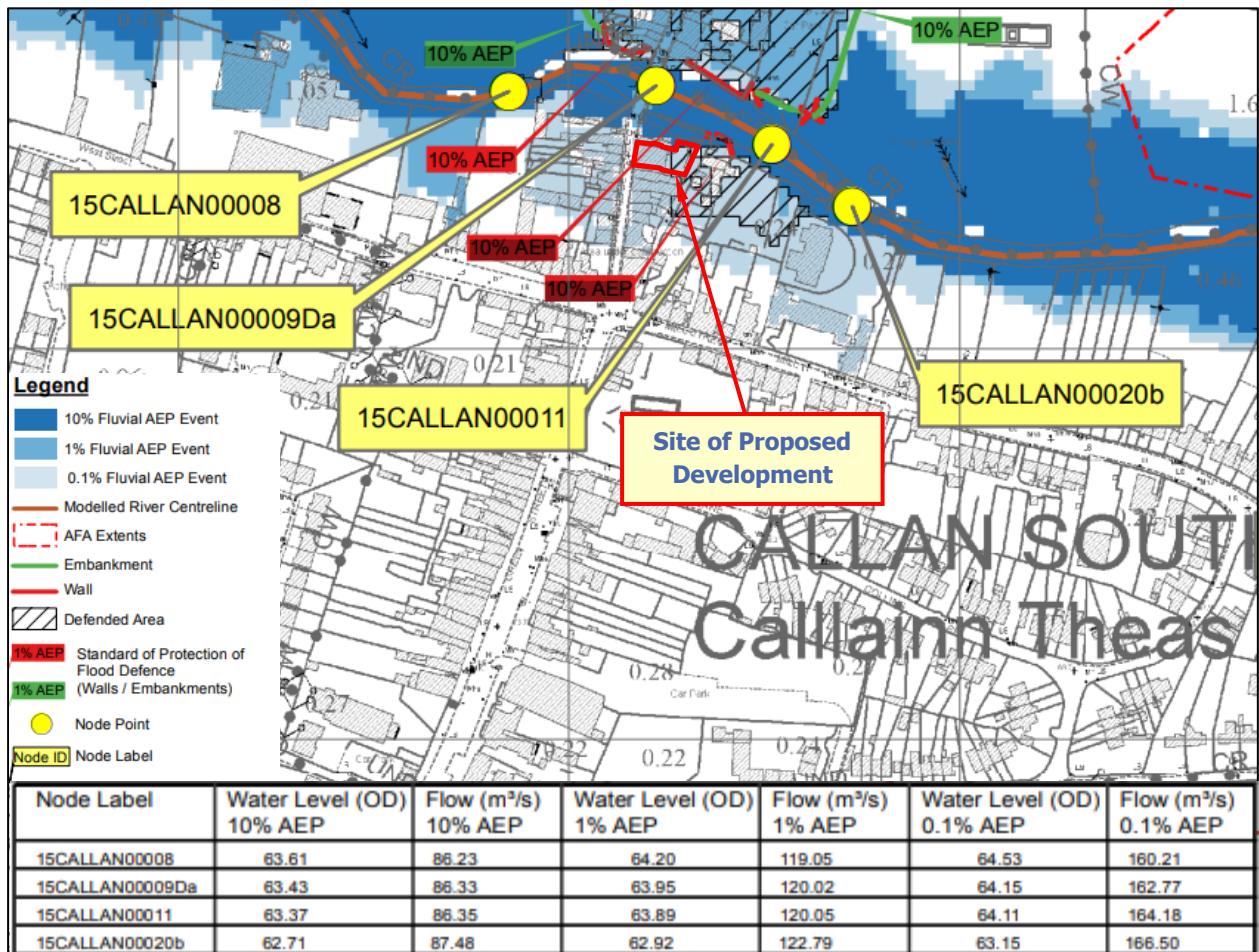


Figure 10 – OPW CFRAMS Fluvial Flood Extent Map

As illustrated in *Figure 10* above, the site of the proposed development does not fall within a predictive present day scenario 10% AEP (1 in 10 year) or 1% AEP (1 in 100 year) fluvial flood zone but does fall within a predictive present day scenario 0.1% AEP (1 in 1000 year) fluvial flood zone.

The South Eastern CFRAMS flood map reference O15CAL_EXFCD_F0_02 also provides information on predictive flood water levels for the present day scenario 10% AEP (1 in 10 year), 1% AEP (1 in 100 year) and 0.1% AEP (1 in 1000 year) fluvial flood events at various node points (hydrological estimation points) along the King's River.

As illustrated in *Figure 10* above, the upstream node point closest to the site of the proposed development site is referenced as node point 15CALLAN00009Da. Predictive flood levels at this node point are applicable for the purposes of assessing potential flood risk to the site.

Details of the predictive fluvial flood levels and flood volumes for CFRAMS node point 15CALLAN00009Da are listed in *Table 2* below.

Node Label	Flood Level (m OD) 10% AEP	Flood Flow (m ³ /s) 10% AEP	Flood Level (m OD) 1% AEP	Flood Flow (m ³ /s) 1% AEP	Flood Level (m OD) 0.1% AEP	Flood Flow (m ³ /s) 0.1% AEP
15CALLAN00009Da	63.43	86.33	63.95	120.02	64.15	162.77

Table 2: CFRAMS Predictive Present Day Scenario Fluvial Flood Volumes & Levels

The South Eastern CFRAMS also provides information and data on predictive flood depths in the general area of the site of the proposed development in consideration of extreme 1% AEP (1 in 100 year) and 0.1% AEP (1 in 1000 year) fluvial flood events.

Figure 11 below (extracted from the South Eastern CFRAMS flood map O15CAL_DPFCD010_F0_02) illustrates the predictive present day scenario 1% AEP (1 in 100 year) fluvial flood depths in the general vicinity of the site of the proposed development.

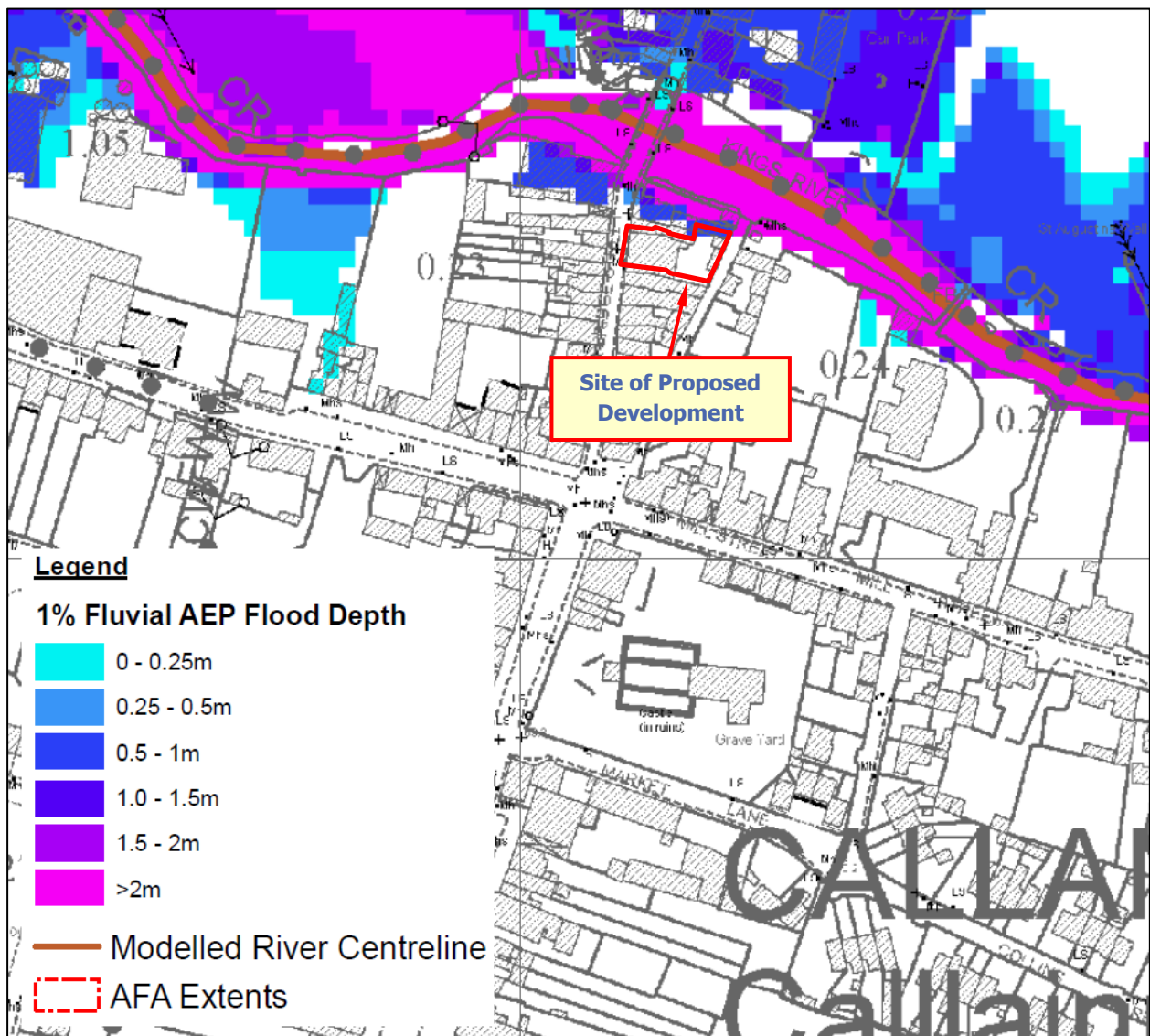


Figure 11 – CFRAMS 1% AEP Flood Depth Map

Figure 11 above indicates that the majority of the site of the proposed development does not fall within a predictive presented day scenario 1% AEP (1 in 100 year) fluvial flood zone. A minor area of the site adjacent to the northern boundary does fall within a predictive presented day scenario 1% AEP (1 in 100 year) fluvial flood zone, with flood depths in the range of 0.5-1.0m.

Figure 12 below (extracted from the South Eastern CFRAMS flood map O15CAL_DPFCD001_F0_02) illustrates the predictive present day scenario 0.1% AEP (1 in 1000 year) fluvial flood depths in the general vicinity of the site of the proposed development.

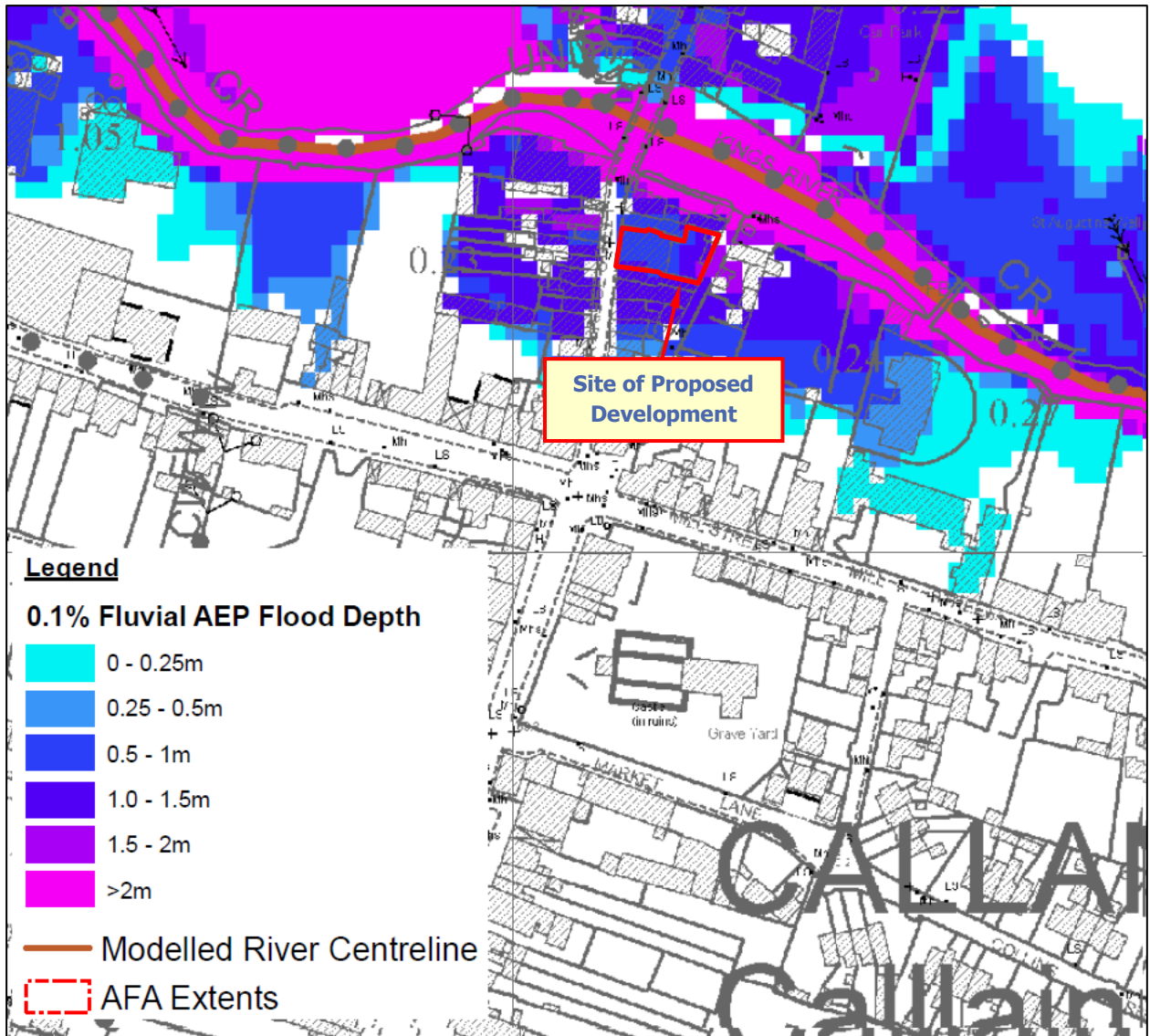


Figure 12 – CFRAMS 0.1% AEP Flood Depth Map

Figure 12 above indicates that the entirety of the site of the proposed development falls within a predictive present day scenario 0.1% AEP (1 in 1000 year) fluvial flood zone, with flood depths in the range of 0.5m-1.5m. A predictive flood depth in the range of 1.5m – 2.0m is mapped within Clodeen Lane adjacent to the eastern boundary of the site.

4.8. Climate Change Scenario

The flood extents illustrated in *Figure 10* above are based on the present day scenario 1% AEP (1 in 100 year) and 0.1% AEP (1 in 1000 year) fluvial flood events in the King’s River and do not account for the potential impact of climate change.

The potential mid-range future climate change scenario 1% AEP + CC (1 in 100 year + climate change) and 0.1% AEP + CC (1 in 1000 year + climate change) fluvial flood extents in the general location of the site of proposed development, as acquired from the OPW WMS dataset resource, are illustrated in *Figure 13* below.



Figure 13 – OPW CFRAMS Mid-Range Future Climate Change Scenario Fluvial Flood Extents

Figure 13 above indicates that the site of the proposed development partially falls within a predictive mid-range future climate change scenario 1% AEP + CC (1 in 100 year + climate change) fluvial flood zone and entirely within a predictive mid-range future climate change scenario 0.1% AEP + CC (1 in 1000 year + climate change) fluvial flood zone.

The OPW WMS dataset resource also provides information on predictive fluvial flood water levels for the predictive mid-range future climate change scenario 1% AEP + CC (1 in 100 year + climate change) and 0.1% AEP + CC (1 in 1000 year + climate change) fluvial flood events at various node points along the modelled reach of the Kings River.

As illustrated in Figure 14 below, the upstream node point closest to the site of the proposed development site is referenced as node point 15CALLAN00009Da. Predictive flood levels at this node point are applicable for the purposes of assessing potential flood risk to the site. Details of the predictive mid-range future climate change scenario fluvial flood flows and flood levels for this node point, as acquired from the OPW WMS dataset resource, are listed in Table 3 below.

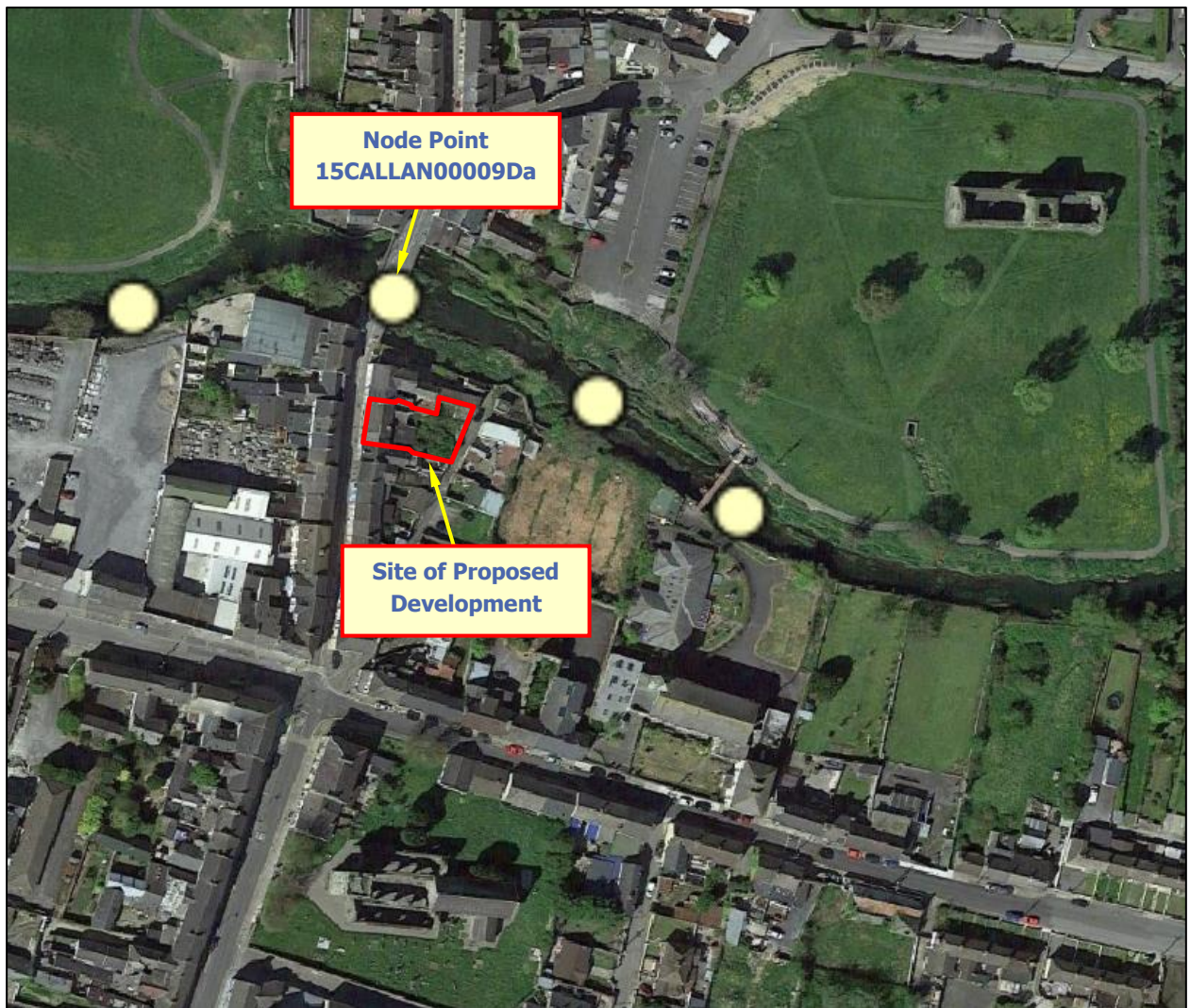


Figure 14 – National CFRAM Dataset Fluvial Node Points

Node Label	Mid-Range Future Scenario			
	1% AEP	1% AEP	0.1% AEP	0.1% AEP
	Water Level (m OD)	Flow (m ³ /s)	Water Level (m OD)	Flow (m ³ /s)
15CALLAN00009Da	64.10	149.92	64.29	204.05

Table 3: CFRAMS Predictive Mid-Range Future Climate Change Scenario Fluvial Flood Volumes & Levels

4.9. Screening Assessment Summary

The above screening assessment indicates that the site of the proposed development does not fall within a predictive present day scenario 1% AEP (1 in 100 year) fluvial flood zone but does fall within a predictive present day scenario 0.1% AEP (1 in 1000 year) fluvial flood zone.

The screening assessment also indicates that the site partially falls within a predictive mid-range future climate change scenario 1% AEP + CC (1 in 100 year + climate change) fluvial flood zone and entirely within a predictive mid-range future climate change scenario 0.1% AEP + CC (1 in 1000 year + climate change) fluvial flood zone.

Predictive present day scenario 1% AEP (1 in 100 year) and 0.1% AEP (1 in 1000 year) flood levels applicable to the site of the proposed development are **63.95m OD** and **64.15m OD** respectively.

Predictive mid-range future climate change scenario 1% AEP + CC (1 in 100 year + climate change) and 0.1% AEP + CC (1 in 1000 year + climate change) flood levels applicable to the site of the proposed development are **64.10m OD** and **64.29m OD** respectively.

The site of the proposed development does not fall within a predictive or indicative pluvial or groundwater 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.

The above screening assessment indicates that the primary flood risk to the site of the proposed development can be attributed to an extreme fluvial flood event in the King's River located beyond the northern boundary of the site.

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

In particular, the present day and climate change scenario flood extent maps and predictive flood levels for the area produced as part of the OPW South Eastern CFRAM study are based on the results of detailed hydraulic modelling undertaken along the King's River and therefore provide a reasonably accurate delineation of flood zones and prediction of extreme flood levels at and in the general vicinity of the site of the proposed development.

The following sections of this study report presents details of the specific flood constraints relative to the site of the proposed development, presents outline recommendations for any flood risk management and mitigation considerations, presents details of any additional assessment and analysis that may be required, and assess if the development as proposed is likely to pass the 'Justification Test for Development Management, as per Section 5.15 of 'The Planning System & Flood Risk Management Guidelines'.

6. Site Specific Flood Constraints

Flood risk from a particular watercourse is normally assessed for a 1% AEP (1 in 100 year) and 0.1% AEP (1 in 1000 year) flood event, in accordance with most county development plans and in accordance with the DoEHLG guidelines '*The Planning System and Flood Risk Management Guidelines*'.

The development as proposed comprises the provision of a new news house to the rear of the existing property onto Clodeen Lane. Information provided by Kilkenny County Council also indicates a proposal to provide an apartment development at first floor level within the existing property, with access off Clodeen Lane.

With respect to the development as proposed, the screening assessment undertaken as part of this Feasibility Stage Site Specific Flood Risk Assessment has identified the following flood constraints:

- The site of the proposed development entirely falls within a predictive present day scenario 0.1% AEP (1 in 1000 year – Flood Zone 'B') fluvial flood zone.
- The predictive present day scenario 1% AEP (1 in 100 year) and 0.1% AEP (1 in 1000 year) flood levels applicable to the site of the proposed development are **63.95m OD** and **64.15m OD** respectively.
- The site of the proposed development partially falls within a predictive mid-range future climate change scenario 1% AEP + CC (1 in 100 year + climate change) fluvial flood zone and entirely falls within a predictive 0.1% AEP + CC (1 in 1000 year + climate change) fluvial flood zone.
- The predictive mid-range future climate change scenario 1% AEP + CC (1 in 100 year + climate change) and 0.1% AEP + CC (1 in 1000 year + climate change) flood levels applicable to the site of the proposed development are **64.10m OD** and **64.29m OD** respectively.
- The finished ground floor level of the existing property within the boundary of the site is constructed to a level of approximately **63.38m OD**, indicating that the ground floor of the existing property may be impacted during the occurrence of a present day scenario 1% AEP (1 in 100 year) and 0.1% AEP (1 in 1000 year) fluvial flood event, and a mid-range future climate change scenario 1% AEP + CC (1 in 100 year + climate change) and 0.1% AEP + CC (1 in 1000 year + climate change) fluvial flood event.

- Existing ground elevations within the undeveloped open space area where the mews house development is proposed range from approximately **63.86m OD** adjacent to the eastern façade of the existing property to **62.50 OD** adjacent to the eastern boundary of the site, indicating that the proposed mews development may be impacted during the occurrence of a present day scenario 1% AEP (1 in 100 year) and a 0.1% AEP (1 in 1000 year) fluvial flood event and a mid-range future climate change scenario 1% AEP + CC (1 in 100 year + climate change) and a 0.1% AEP + CC (1 in 1000 year + climate change) fluvial flood event.
- As illustrated in *Figure 12* above, predictive present day scenario 0.1% AEP (1 in 1000 year) flood depths within the boundary of the site range from 0.50m-1.5m. A predictive flood depth in the range of 1.5m – 2.0m is mapped within Clodeen Lane adjacent to the eastern boundary of the site. The predictive 0.1% AEP (1 in 1000 year) flood depth mapped within Clodeen Lane would present a significant impedence to emergency vehicular access to and egress from the site.
- The proposed mews house has the potential to displace flood water volumes and potentially increase flood risk to adjacent properties and elsewhere.
- A suitable emergency flood evacuation plan would need to be developed and implemented for the development as proposed.

Summary

In consideration of the screening assessment undertaken as part of this Feasibility Stage Site Specific Flood Risk Assessment and the site specific flood constraints listed above, in terms of potential flood risk, the site of the proposed development is not particularly suitable for development of residential accommodation.

If however the development as proposed is to proceed, then the development will, as a minimum, need to incorporate the following outline flood risk management and mitigation measures, if feasible.

7. Outline Flood Risk Management & Mitigation Measures

Flood resistance measures are defined as *'the installation of resistance measures to prevent floodwater from reaching or entering a property'*.

Flood resilience measures are defined as *'the implementation of permanent methods or techniques that can be carried out at property level i.e. inside a property, to minimise damage caused by floodwaters that have entered a property'*.

7.1. Flood Resistance Measures

As a minimum, it is recommended that the following summary flood resistance measures be implemented for any proposed residential development at this location:

- *The finished ground floor level of the proposed mews house should be constructed to a minimum level of 0.35m above the predictive present day scenario 0.1% AEP (1 in 1000 year) flood level – i.e. 64.15m OD + 0.35m = **64.50m OD**.*
- *Where it is not possible from a planning or constructability perspective to construct the finished ground floor level of the proposed mews house to the recommendation above, then residential accommodation should only be provided at first floor level, with ground floor level only utilised for less vulnerable use – i.e. storage, car parking, etc.*
- *Existing external walls below a level of 64.15m OD should be sealed with a suitable waterproof sealant or membrane.*
- *Any existing or proposed air bricks in external walls should be sealed using 'SMART' air bricks.*
- *Any pipes or cables that protrude through external walls at a level below 64.15m OD should be adequately sealed and waterproofed.*
- *Non return valves, or anti-flood valves, should be fitted to the drainage network connecting the property to the existing sewerage system.*

7.2. Flood Resilience Measures

As a minimum, it is recommended that the following flood resilience measures be incorporated for any proposed residential development at this location:

- *Ground floor electrical appliances should be placed on shelves or plinths in order to raise the appliance at least 0.6m above the finished ground floor level.*

- *Ground floor service meters (electric, gas, telecoms, etc.) should be enclosed in plastic housings and should be fitted above the maximum potential present day scenario 0.1% AEP (1 in 1000 year) flood level of 64.15m OD.*
- *Ground floor fuses boxes, electrical sockets and wiring should be constructed above the maximum potential present day scenario 0.1% AEP (1 in 1000 year) flood level of 61.15m OD.*
- *Any proposed ground floor boilers or water heaters should be wall fitted above the maximum potential present day scenario 0.1% AEP (1 in 1000 year) flood level of 64.15m OD.*

8. 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% or 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 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 screening assessment undertaken a part of this Feasibility Stage Site Specific Flood Risk Assessment indicates that the site of the proposed development falls within a predictive present day scenario Flood Zone 'B' and mid-range future climate change scenario Flood Zone 'A' and Flood Zone 'B'.

In accordance with the '*Planning System & Flood Risk Management Guidelines, DOEGLG, 2009*' the development as proposed may be subject to the requirements of The Justification Test for Development Management.

9. Justification Test for Development Management

In the context of the 'Planning System and Flood Risk Management Guidelines, DOEHLG, 2009' and in consideration of the scenario that the development as proposed is undefended, this Feasibility Stage Site Specific Flood Risk Assessment indicates that the site of the proposed development falls within Flood Zone 'A' and Flood Zone 'B'.

Table 3.1 of the guidelines lists the vulnerability class of various types of development. The development as proposed is Residential which is 'Highly Vulnerable Development'.

Table 3.2 of the guidelines (duplicated below) provides a matrix of different vulnerability classes of development in relation to Flood Zones A, B and C, and lists if development is appropriate in each Zone and where the Justification Test should be applied.

	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

Table 3.2: Matrix of vulnerability versus flood zone to illustrate appropriate development and that required to meet the Justification Test

With reference to the table above, the type and form of development proposed is 'Highly Vulnerable development' (i.e. residential) and the site falls within a delineated Flood Zone 'A' and Flood Zone 'B', therefore development proposals for the site are subject to the Justification Test.

Where 'Highly Vulnerable Development' is proposed within a delineated fluvial Flood Zone 'A' or Flood Zone 'B' the planning authority must be satisfied that the development satisfies each of the criteria of the Justification Test as described in Box 5.1 of the guidelines (duplicated below):

Box 5.1 Justification Test for development management (to be submitted by the applicant)

When considering proposals for development, which may be vulnerable to flooding, and that would generally be inappropriate as set out in Table 3.2, the following criteria must be satisfied:

1. The subject lands have been zoned or otherwise designated for the particular use or form of development in an operative development plan, which has been adopted or varied taking account of these Guidelines.
2. The proposal has been subject to an appropriate flood risk assessment that demonstrates:
 - (i) The development proposed will not increase flood risk elsewhere and, if practicable, will reduce overall flood risk;
 - (ii) The development proposal includes measures to minimise flood risk to people, property, the economy and the environment as far as reasonably possible;
 - (iii) The development proposed includes measures to ensure that residual risks to the area and/or development can be managed to an acceptable level as regards the adequacy of existing flood protection measures or the design, implementation and funding of any future flood risk management measures and provisions for emergency services access; and
 - (iv) The development proposed addresses the above in a manner that is compatible with the achievement of wider planning objectives in relation to development of good urban design and vibrant and active streetscapes.

The acceptability or otherwise of levels of residual risk should be made with consideration of the type and foreseen use of the development and the local development context.

Note: See section 5.27 in relation to major development on zoned lands where sequential approach has not been applied in the operative development plan.

Refer to section 5.28 in relation to minor and infill developments.

Each of the criteria listed in Box 5.1 above are considered as follows, and commentary provided as to the likelihood of the development as proposal passing each of these criteria.

1. The subject lands have been zoned or otherwise designated for the particular use or form of development in an operative development plan, which has been adopted or varied taking account of these guidelines.

Answer – A response to this criteria will need to be provided by the planning department of Kilkenny County Council, however it is considered that the development as proposed will pass this criteria.

2. The proposal has been subject to an appropriate flood risk assessment that demonstrates:

- (i) The development proposed will not increase flood risk elsewhere and, if practical will reduce overall flood risk;

Answer – In order to demonstrate if the development as proposed will or will not pass this criteria, additional assessment and analysis would be required, including hydraulic modelling, in order to quantify the hydraulic impact of the development and the potential for the development to displace flood water volumes and potentially increase flood risk to adjacent properties and elsewhere.

- (ii) The development proposal includes measures to minimise flood risk to people, property, the economy and the environment as far as reasonably possible;

Answer – Any proposed residential development at this location would, as a minimum, need to implement appropriate flood risk management and mitigation measures as outlined in Section 7 above. In this regard it is considered that the development as proposed would pass this criteria.

- (iii) The development proposed includes measures to ensure that residual risks to the area and/or development can be managed to an acceptable level as regards the adequacy of existing flood protection measures or the design, implementation and funding or any future flood risk management measures and provisions for emergency services access;

Answer – The development as proposed is not dependant on any existing flood protection measures or on the design, implementation and funding or any future flood risk management measures. Emergency vehicles access to and egress from the development as proposed may however be significantly impeded during the occurrence of an extreme fluvial flood event due to significant predictive flood depths which are mapped within Clodeen Lane. In this regard it is considered that the development as proposed would not pass this criteria.

(iv) The development proposed addresses the above in a manner that is also compatible with the achievement of wider planning objectives in relation to development of good urban design and vibrant and active streetscapes;

Answer – A response to this criteria will need to be provided by the planning department of Kilkenny County Council, however it is considered that the development as proposed will pass this criteria.

Justification Test Summary

With respect to each criteria of the Justification Test for Development Management as presented above, the likelihood of the development as proposal passing each of these criteria is summarised as follows:

Criteria 1 – likely to **pass**

Criteria 2(i) – additional assessment and analysis required

Criteria 2(ii) – likely to **pass**

Criteria 2(iii) – likely to **fail**

Criteria 2(iv) – likely to **pass**

10. Additional Assessment & Analysis Requirements

If the development as proposed is proceed to Part 8 planning stage, then it is recommended that the following additional assessment and analysis be undertaken in support of any future planning application.

- A Stage 3 Site Specific Flood Risk Assessment would be required. In particular a detailed hydraulic modelling exercise would be required in order to quantify the potential for the proposed mews house to displace flood water volumes and to potentially increase flood risk to adjacent properties and elsewhere. An assessment and analysis would also be required in order to quantify potential residual flood risk to the development due to potential blockage of the road bridge on the King's River.
- An appropriate emergency flood excavation plan would need to be developed for the this development proposal.

11. Summary Conclusions

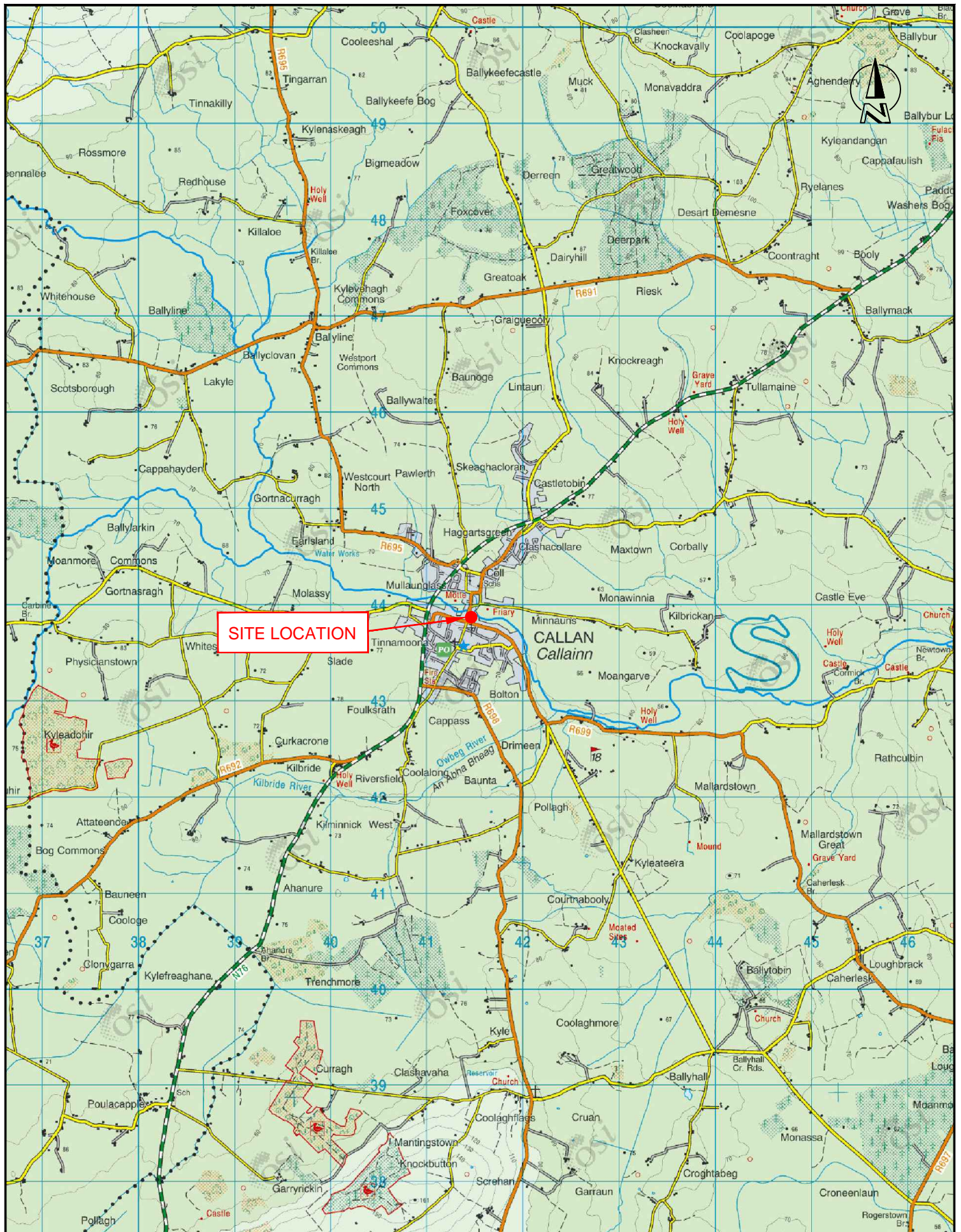
In consideration of the findings of this Feasibility Stage Site Specific Flood Risk Assessment and analysis the following conclusions are made in respect of the site of the proposed development:

- *A Feasibility Stage 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 site of the proposed development has been screened, scoped and assessed for flood risk in accordance with the above guidelines.*
- *The primary flood risk to the site of the proposed development site can be attributed to an extreme fluvial flood event in the King's River located beyond the northern boundary of the site.*
- *The site is not at risk of pluvial or groundwater flooding.*
- *The site of the proposed development falls within a predictive present day scenario 0.1% AEP (1 in 1000 year – Flood Zone 'B') fluvial flood zone.*
- *The site of the proposed development partially falls within a predictive mid-range future climate change scenario 1% AEP + CC (1 in 100 year + climate change) fluvial flood zone and entirely falls within a predictive 0.1% AEP + CC (1 in 1000 year + climate change) fluvial flood zone.*
- *In terms of potential flood risk, the site of the proposed development is not particularly suitable for development of residential accommodation.*
- *If however the development as proposed is to proceed, then the development will, as a minimum, need to incorporate appropriate flood risk management and mitigation measures, if feasible, as listed in Section 7 of this study report.*
- *If the development as proposed is to proceed then the development is likely to fail at least one of the criteria (Criteria 2(iii)) of The Justification Test for Development Management.*

Appendices

Appendix A. Drawings

IE2770-SA-001-A - Site Location



SITE LOCATION

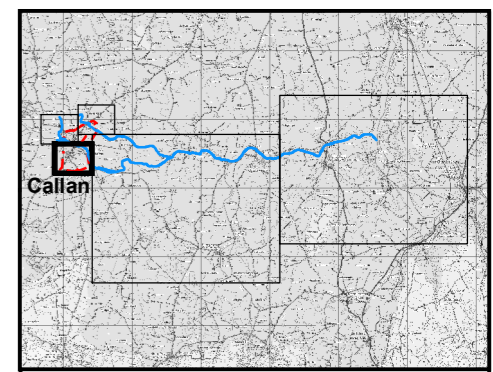
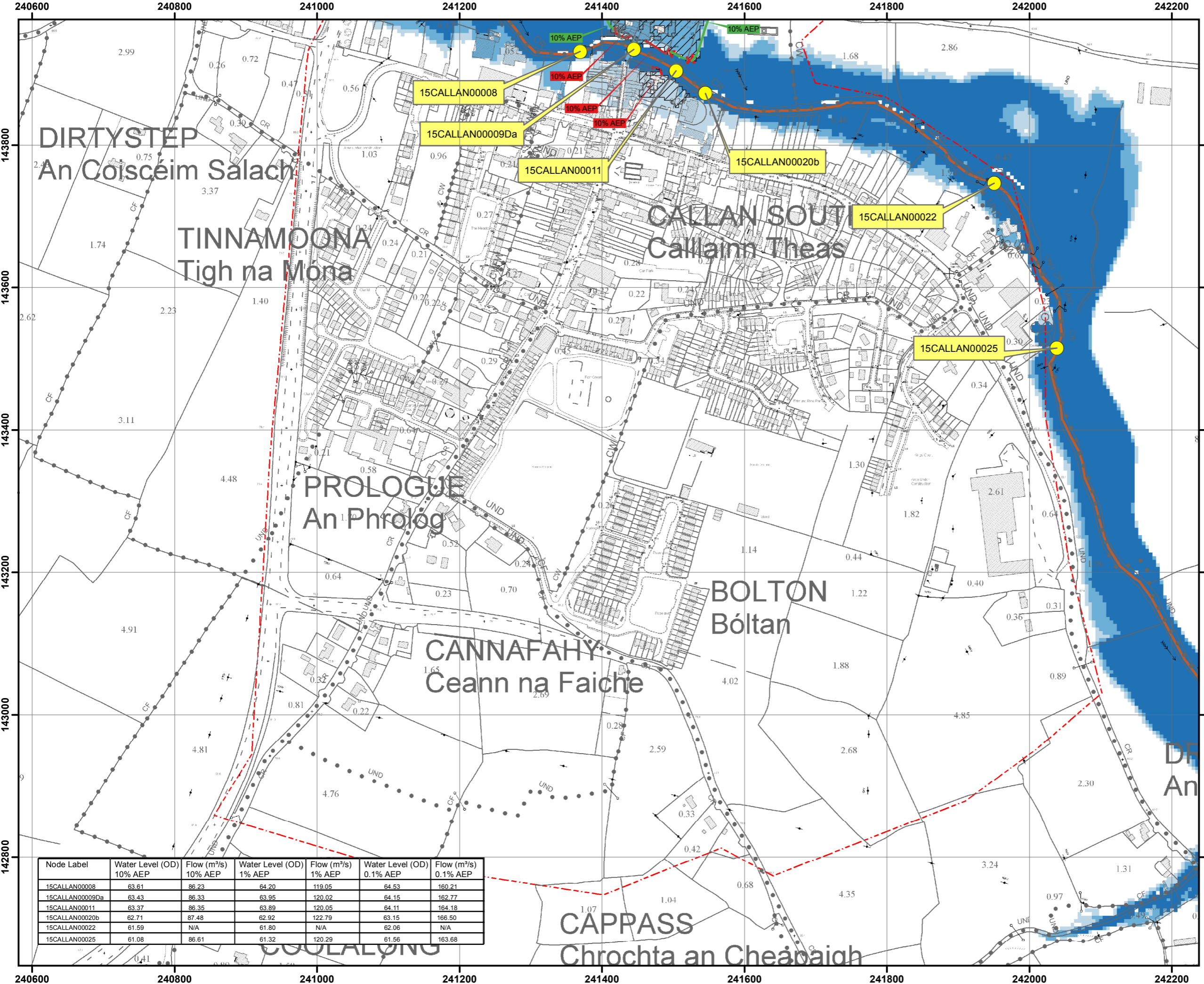
IE Consulting
 Innovation Centre,
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 Carlow.
 Ph: 059-9133084
 Fax: 059-9140499
 E-mail: info@iece.ie



Project Title:		FLOOD RISK ASSESSMENT			
Project Address:		18 UPPER BRIDGE ST, CALLAN, CO. KILKENNY			
Client:		KILKENNY COUNTY COUNCIL			
Drg. Title:		SITE LOCATION MAP			
Dwg. Scale:	Date:	Dwg.No:	Job No:	Revision:	Dwg.By:
1:50,000	11/09/23	2770-SA-001	IE2770	A	LMC

Appendix B. OPW CFRAMS Map

O15CAL_EXFCD_F0_02



IMPORTANT USER NOTE:
THE VIEWER OF THIS MAP SHOULD REFER TO THE DISCLAIMER, GUIDANCE NOTES AND CONDITIONS OF USE THAT ACCOMPANY THIS MAP.

- Legend**
- 10% Fluvial AEP Event
 - 1% Fluvial AEP Event
 - 0.1% Fluvial AEP Event
 - Modelled River Centreline
 - AFA Extents
 - Embankment
 - Wall
 - Defended Area
 - 10% AEP Standard of Protection of Flood Defence (Walls / Embankments)
 - 1% AEP Standard of Protection of Flood Defence (Walls / Embankments)
 - Node Point
 - Node ID Node Label

FINAL

REV:	NOTE:	DATE:
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The Office of Public Works
Jonathan Swift Street
Trim
Co Meath

Elmwood House
74 Boucher Road
Belfast
BT12 6RZ
E ireland@rpsgroup.com

Node Label	Water Level (OD)		Flow (m ³ /s)		Water Level (OD)		Flow (m ³ /s)	
	10% AEP	1% AEP	10% AEP	1% AEP	0.1% AEP	1% AEP	0.1% AEP	1% AEP
15CALLAN00008	63.61	86.23	64.20	119.05	64.53	64.53	160.21	162.77
15CALLAN00009Da	63.43	86.33	63.95	120.02	64.15	64.15	164.18	166.50
15CALLAN00011	63.37	86.35	63.89	120.05	64.11	64.11	164.18	166.50
15CALLAN00020b	62.71	87.48	62.92	122.79	63.15	63.15	166.50	166.50
15CALLAN00022	61.59	N/A	61.80	N/A	62.06	62.06	N/A	N/A
15CALLAN00025	61.08	86.61	61.32	120.29	61.56	61.56	163.68	163.68



Map:	
Callan Fluvial Flood Extents	
Map Type: EXTENT	
Source: FLUVIAL	
Map Area: HPW	
Scenario: CURRENT	
Drawn By : C.C.	Date : 21 July 2016
Checked By : E.H.	Date : 21 July 2016
Approved By : S.P.	Date : 21 July 2016
Drawing No. :	
O15CAL_EXFCD_F0_02	
Map Series : Page 2 of 5	
Drawing Scale : 1:5,000 @A3	