

SITE SPECIFIC FLOOD RISK ASSESSMENT

Development at Riverbank Arts Centre,
Main Street Newbridge, Co. Kildare

Issue P01

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1 Introduction

1.1 Background

CORA Consulting Engineers were commissioned by Studio Red Architects on behalf of Kildare County Council to prepare a Site Specific Flood Risk Assessment (SSFRA) for the proposed re-development of the Riverbank Arts Centre, Main Street, Newbridge, Co. Kildare. SSFRA was prepared to comply with current planning legislation and forms part of proposed planning application for the subject site.

1.2 Objectives

The objectives of this report are to inform the planning authority regarding flood risk for the potential development of the lands. The report will assess the site and development proposals in accordance with the requirements of “*The Planning System and Flood Risk Management Guidelines for Planning Authorities*”.

The report will provide the following;

- The site’s flood zone category.
- Information to allow an informed decision of the planning application in the context of flood risk.
- Appropriate flood risk mitigation and management measures for any residual flood risk.

1.3 Flood Risk Assessment Scope

This SSFRA relates only to the proposed development site in the vicinity of the Riverbank Arts Centre, Main Street and its immediate surroundings. This report uses information obtained from various sources, together with an assessment of flood risk for the existing land and proposed development. The report follows the requirements of ‘*The Planning System & Flood Risk Management - Guidelines for Planning Authorities*’, (referred to as the *Guidelines* for the remainder of this report) and the Kildare County Council Development Plan 2023-2029 Strategic Flood Risk Assessment (SFRA) which references the Newbridge Local Area plan 2013-219 draft strategic flood risk assessment (SFRA). At the time of writing the Newbridge Local area plan 2025-2031 is in the pre-draft stage.

1.4 Existing Site

The site is located on the corner of Main Street and Liffey Terrace. The site is within the jurisdiction of Kildare County Council. The site is approximately 0.18 ha in area. It is currently occupied by the Riverbanks Arts Centre with near complete hardstanding and roof coverage.

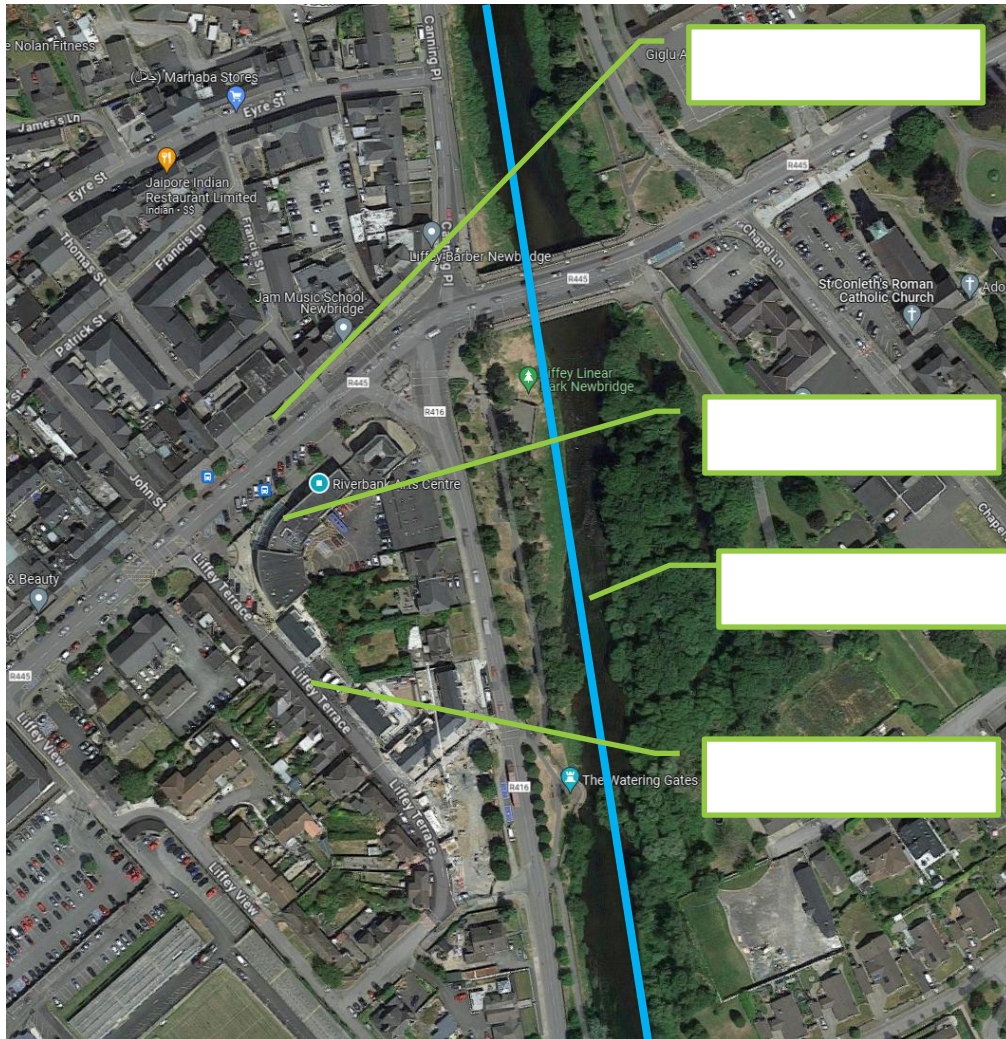


Figure 1 Site Location Google maps

The site is zoned as Zone A - Town Centre in the Newbridge Local Area Plan 2013-2019 map 7. The 2025-2031 Local Area plan is currently in pre-draft stage.

A review of the Office of Public Works records in relation to flooding reveals that there has been no history of flooding to the site or in the general locality.

1.5 Proposed Development

The proposal comprises the provision of new enhanced cultural facilities at the subject site in the form of a new Art Centre and all associated ancillary elements. The proposal is a component of the proposed new cultural quarter which includes the redevelopment of the adjoining county library.

The proposed development is the subject of a Part 8 proposal by Kildare County Council in partnership with Riverbank Arts Centre. The proposal includes the demolition of the original building and the construction of a new two-storey arts centre structure, along with associated services, landscaping, and public realm elements.

Due to its location, the proposed new arts centre building will form an important landmark building and re-invigorated cultural focus for Kildare, which will contribute to the creation of the overall Cultural Quarter proposals within Newbridge. It will also complement the regeneration of the neighbouring library.

2 Planning Guidelines and Flood Risk Assessment

2.1 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....” They ensure a consistent approach throughout the country requiring identification of flood risk and flood risk assessment to be key considerations when preparing development plans, local area plans and planned development.

“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.
- 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 complied with for flood risk management.”

The key principles of The FRM Guidelines are to apply the Sequential Approach 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.”

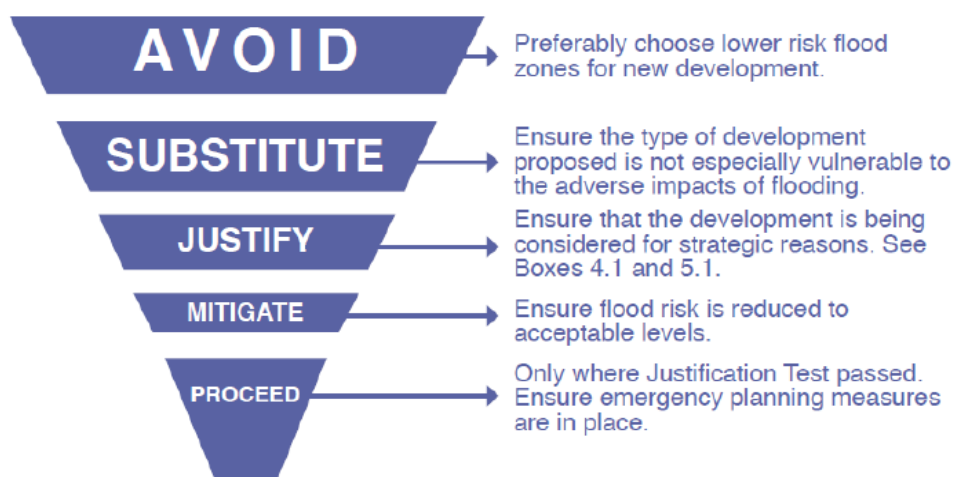


Figure 2 Sequential approach principles in flood risk management

Where the *Sequential Test's* **avoid** and **substitute** principals are not appropriate then the FRM Guidelines propose that a *Justification Test* be applied to assess the appropriateness, or otherwise, of particular developments that are being considered in areas of moderate or high flood risk.

2.1.1 Flood Risk Assessment

The assessment of flood risk requires an understanding of where water comes from (the source), how and where it flows (the pathways) and the people and assets affected by it (the receptors).

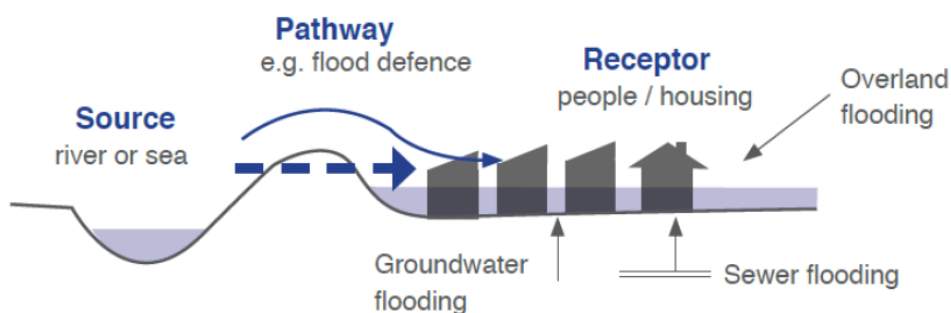


Figure 3 Source-Pathway-Receptor Model

The principal sources are rainfall or higher than normal sea levels. The principal pathways are rivers, drains, sewers, overland flow and river and coastal floodplains and their defence assets. The receptors can include people, their property and the environment. All three elements are examined as part of the flood risk assessment including the vulnerability and exposure of receptors to determine potential consequences. Mitigation measures typically used in development management can reduce the impact of flooding on people and communities e.g. 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.

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

2.2 Flood Risk Assessment Stages

The FRM Guidelines outline that a staged approach should be adopted when carrying out 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 a SSFRA be undertaken to assess flood risk for individual planning applications. This SSFRA comprises Stages 1, 2 and 3 involving both identification and more detailed assessment of flood risks and surface water management related to the planned development site.

2.3 Flood Zones

The FRM Guidelines use flood zones to determine the likelihood of flooding and for flood risk management within the planning process. The three flood zone levels are:

- Flood Zone A - where the probability of flooding from rivers and the sea is highest (greater than 1% AEP (Annual Exceedance Probability) or 1 in 100 for river flooding;
- Flood Zone B - where the probability of flooding from rivers and the sea is moderate (between 0.1% AEP or 1 in 1000 and 1% AEP or 1 in 100 for river flooding or between 0.1% AEP or 1 in 1000 and 0.5% AEP or 1 in 200 for coastal flooding); and

- Flood Zone C - where the probability of flooding from rivers and the sea is low (less than 0.1% AEP or 1 in 1000 for both river and coastal flooding). Flood Zone C covers all areas outside zones A and B.

The FRM Guidelines categorises all types of development as either;

- Highly Vulnerable e.g. dwellings, hospitals, fire stations, essential infrastructure,
- Less Vulnerable e.g. retail, commercial or industrial buildings, local transport infrastructure.
- Water Compatible e.g. flood infrastructure, docks, amenity open space.

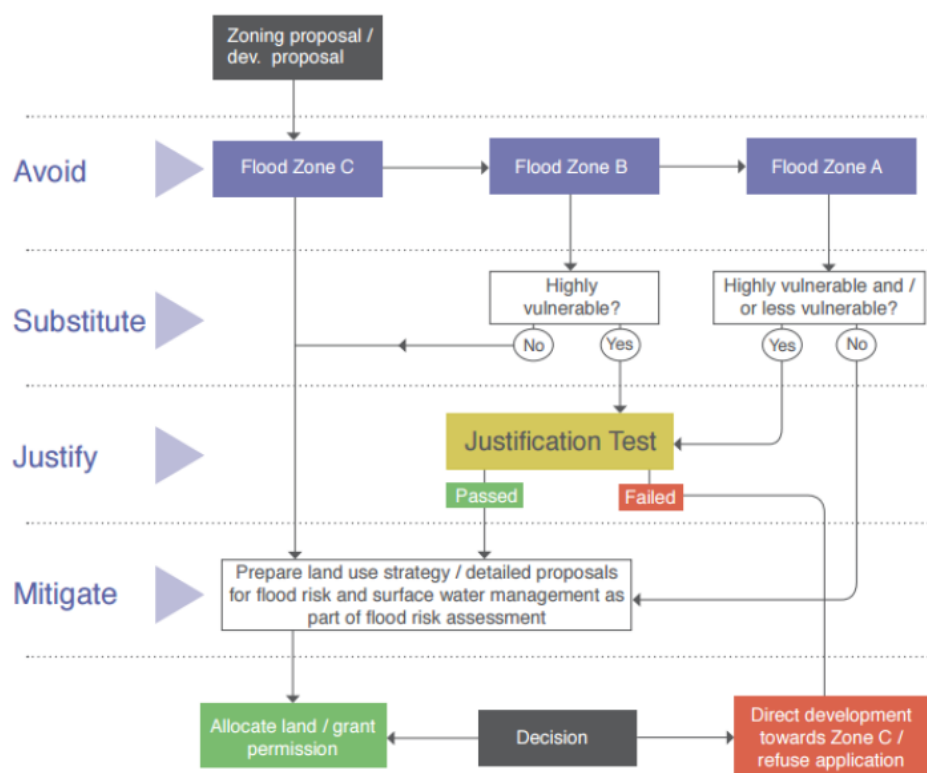


Figure 4 Sequential approach mechanism in the planning process

The Sequential Approach restricts development types to occur within the flood zone appropriate to their vulnerability class, see figure 2.4.

	Flood Zone A	Flood Zone B	Flood Zone C
Highly vulnerable development (including essential infrastructure)	Justification Test	Justification Test	Appropriate
Less vulnerable development	Justification Test	Appropriate	Appropriate
Water-compatible development	Appropriate	Appropriate	Appropriate

Figure 5 table 3.2 from the FRM guidelines - matrix of vulnerability versus flood Zone to illustrate appropriate development and that required to meet the justification test

The Newbridge Local Area Plan SFRA identifies the subject site is within **Flood Zone C**.

2.4 Proposed Development's Vulnerability

The proposed type of development for this site is to be amenity/commercial. Commercial developments are categorised as **less vulnerable**. Less vulnerable developments are appropriate in Flood Zone B & C.

2.5 Site Specific Flood Risk Assessment for development.

The FRM Guidelines require a SSFRA to “gather relevant information sufficient to identify and assess all sources of flood risk and the impact of drainage from the proposal”. It should “quantify the risks and the effects of any necessary mitigation, together with the measures needed or proposed to manage residual risks”. It considers the nature of flood hazard, taking account of the presence of any flood risk management measures such as flood protection schemes and how development will reduce the flood risk to acceptable levels. A detailed assessment for a development application should conclude that the core flood risk elements of the Justification Test are passed and that residual risks can be successfully managed with no unacceptable impacts on adjacent lands.

2.6 SSFRA Key Outputs

Key outputs of an SSFRA are:

- Plans showing the site and development proposals including its relationship with watercourses and structures which may influence local hydraulics;
- Surveys of site levels and comparison of development levels relative to sources of flooding and likely flood water levels;
- Assessments of;

- Potential sources of flood risk;
 - Existing flood alleviation measures;
 - Potential impact of flooding on the site.
- How the layout and form of the development can reduce those impacts, including arrangements for safe access and egress.
- Proposals for surface water management and sustainable drainage.
- The effectiveness and impact of any mitigation measures.
- The residual risks to the site after the construction of any necessary measures and the means of managing those risks; and
- How flood risks are managed for occupants / employees of the site and its infrastructure.

2.7 Summary of Site Criteria

Following a review of the Planning Guidelines, we set out below the site specific criteria for the development and level of flood event to be considered in the subsequent flood risk assessment.

- Flood Zone - The site is located within Flood Zone C.
 - Newbridge Local Area Plan (SFRA) drawing - Flood Risk Zones as determined by SFRA
- Development Vulnerability
 - Amenity/Commercial - Less vulnerable
- Flood Events Considered
 - Fluvial (River) - 1% AEP, 1 in 100 year event
- As the site is a Less Vulnerable development within Flood Zone C, A justification Test is not required.

3 Stage 1 Flood Risk Identification

3.1 Available Flood Risk Information

The initial flood risk identification stage uses existing information to identify and confirm whether there may be flooding or surface water management issues for the lands in question that may warrant further investigation.

To initially identify potential flood risks for the existing site and surrounding area a number of available data sources were consulted, these are listed in Table 3.1 below.

	Information Source	Coverage	Quality	Confidence	Identified Flood Risks	Flood Risk
Primary Data Source and Modelled Data	OPW ECFRAM - Fluvial https://www.floodinfo.ie/map/floodmaps/	Regional	High	High	Flood maps indicate that the development is at risk of Fluvial Flooding	N
	OPW ECFRAM - Tidal https://www.floodinfo.ie/map/floodmaps/	Regional	High	High	Tidal flood maps indicate that the subject site is outside Tidal Flood Zones.	N
	OPW ECFRAM - Pluvial https://www.floodinfo.ie/map/floodmaps/	Regional	low	High	Pluvial Flood Maps risk in the vicinity of the site, However the site is outside of the predicted flood extent	N
	ICPSS	Nationwide	Moderate to High	Moderate to High	ICPSS maps indicate that the site is located outside Tidal Flood Zones.	N
	Newbridge Local Area Plan SFRA	Local	Moderate to High	Moderate to High	Development is located within Flood Zone C.	N
Secondary Data Source	Walkover Survey	Local	Varies	Varies	Existing Theatre & Arts centre unit with no history of flooding. Full site coverage, approximately level throughout with a drop in levels to surrounding road levels. All drainage underground.	N
	OPW Historic Flood Records	Nationwide	Varies	Varies	No records of site flooding.	N
	Historic OSI Maps	Nationwide	Moderate	Low	Site occupied with structure. No historic record	N
	EPA Ex. Rivers	Nationwide	Moderate	Moderate	River Liffey to the East of the site.	N
	Drainage Records	Nationwide	Moderate	Moderate	Existing below ground connection to foul sewer on Main Street, Newbridge	N
	Geological Survey Ireland Maps	County	Moderate	Low		N
	Topographic Surveys	Local	High	High	Existing floor level +86.465m AOD.	N

Table 1 Flood risk sources

3.2 Identified Flood Risks/ Flood Sources

Fluvial Flood Risk

The OPW's Eastern CFRAM study produced flood risk maps and the assessment of fluvial flood plains over the eastern region of Ireland. The OPW have consolidated this information onto the <https://www.floodinfo.ie/map/floodmaps/> website.

As part of this study the River Liffey was assessed as the site falls adjacent to this watercourse. The figures below shows that the site is outside the predicted flood plain for all events 10% (1 in 10 year) AEP event, 1% (1 in 100) AEP and 0.1% (1 in 1000) AEP event. The information on these figures give exact predicted flood levels.

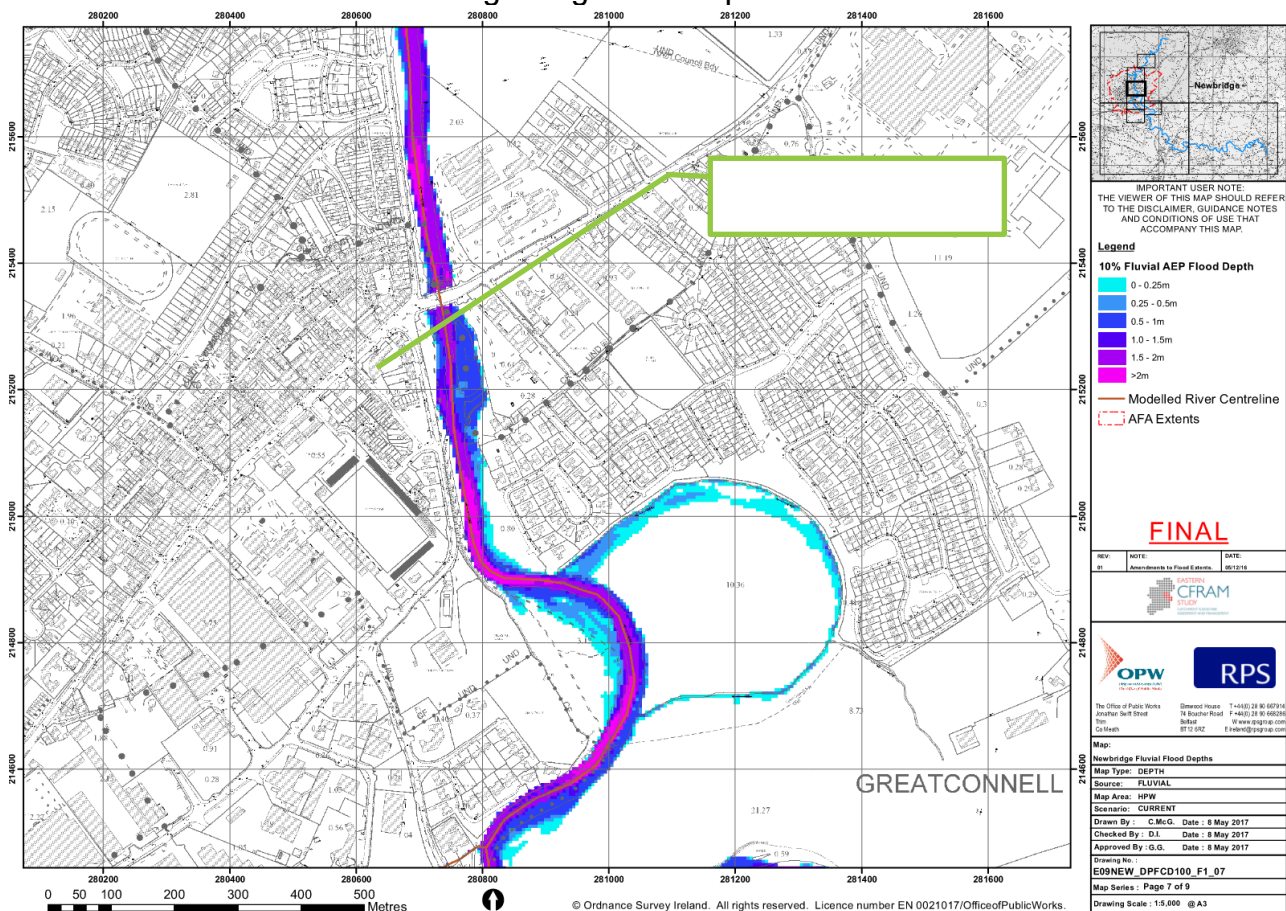


Figure 6 Fluvial Flooding 10% AEP

As can be seen above there is no predicted flooding of the site for the 1 in 10 year AEP event.

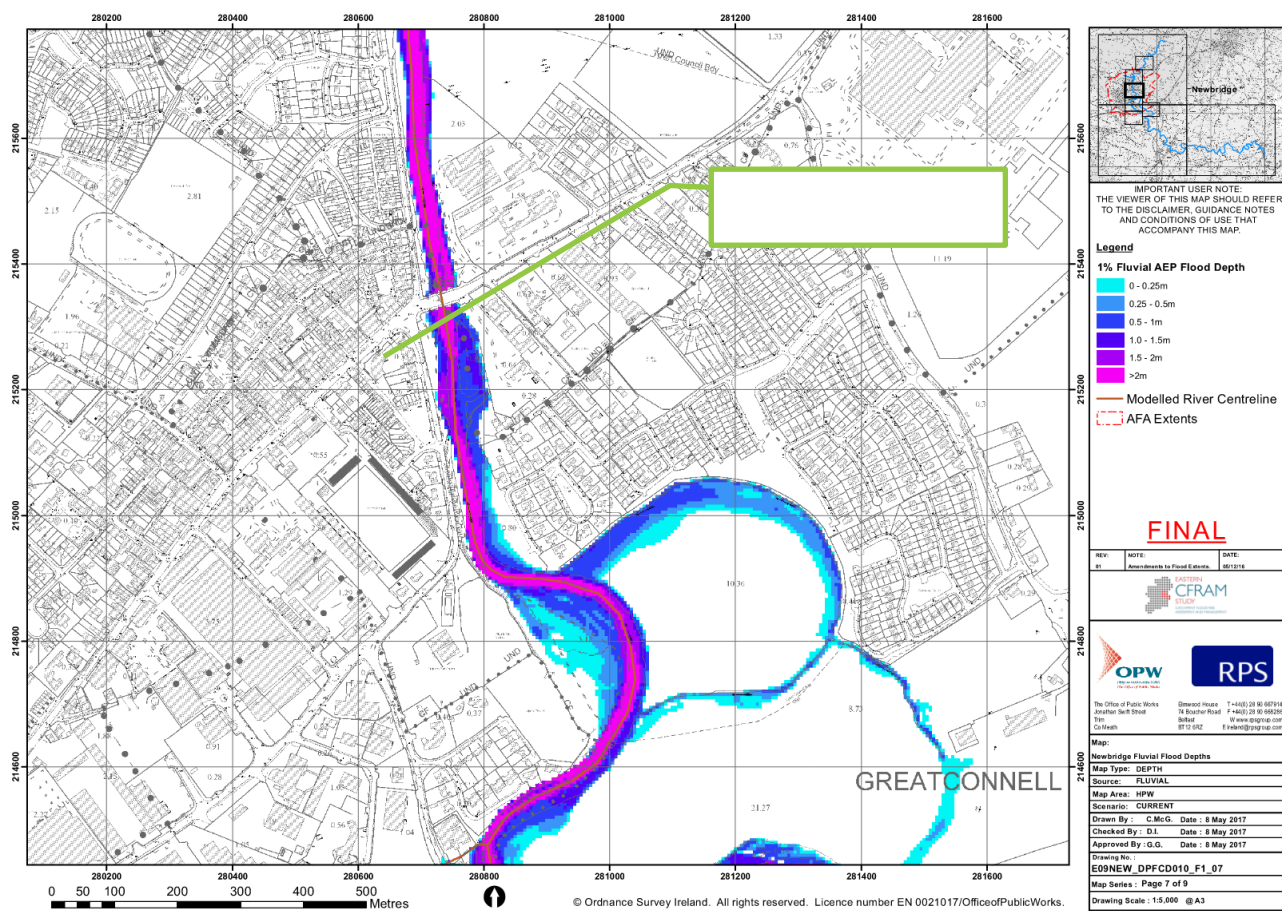


Figure 7 Fluvial Flooding 1% AEP

For the 1 in 100 year fluvial event there is no predicted flooding to the site.

Tidal Flood Risk

The OPW ECFRAM coastal flood risk analysis for 10%, 0.5% and 0.1% AEP events (including High end future analysis) show the site is outside the extents of all predicted coastal flood events as seen below..

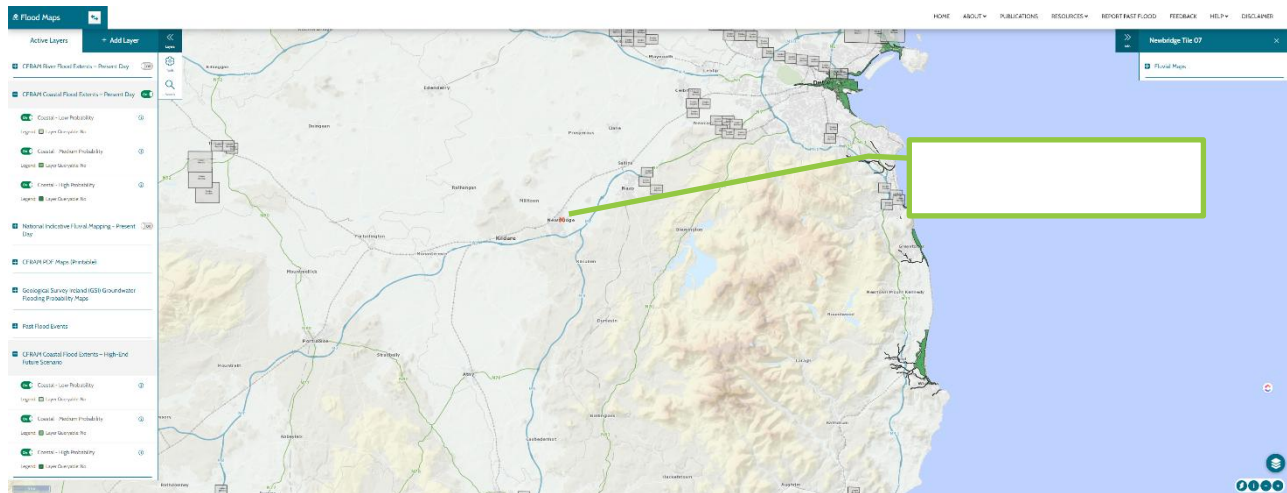


Figure 10 Tidal Flooding (0.1%, 0.5% & 10% AEP)

Pluvial Flood Risk

Furthermore, the OPW's ECFRAM Study also assessed effects of pluvial flooding in the area. The extent of pluvial flood prediction does not extent to the subject site. As such the pluvial flood risk is further evaluated in regards to site topography and past flooding.

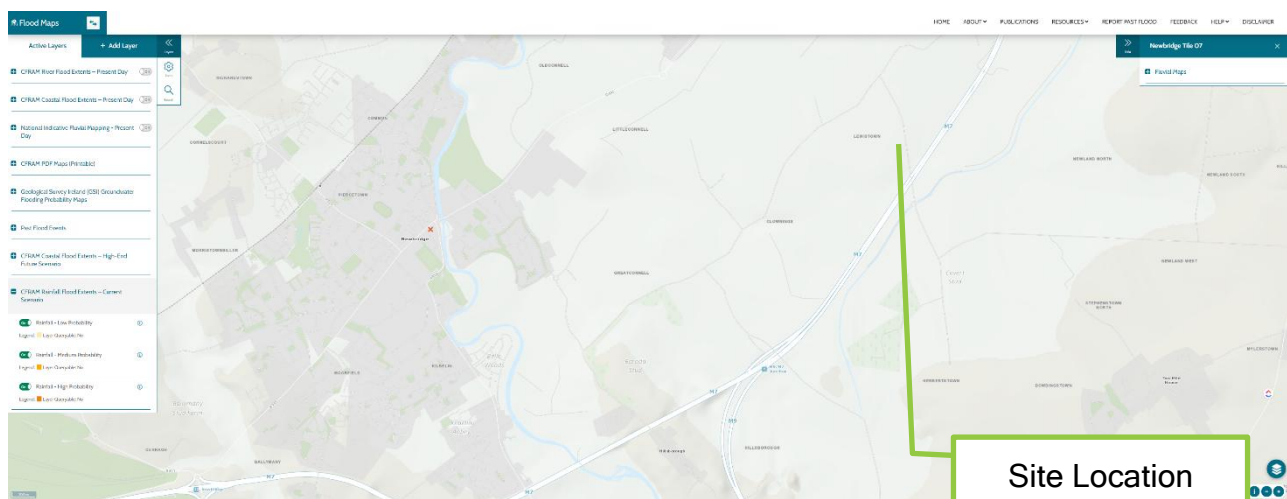


Figure 11 Pluvial Flooding (0.1%, 0.5% & 10%)

The proposed floor level is 86.465m to tie in with the existing centre floor level. The street level on Main street to the west of the site is recorded as 88.23m falling to 84.58m at the north eastern end at the bridge over the River Liffey.

Newbridge Local Area Plan Strategic Flood Risk Assessment

The Newbridge Local Area Plan 2013-2019 includes a Strategic Flood Risk Assessment (SFRA) which uses the draft ECFRAM mapping as its basis for identifying areas at flood risk. The SFRA identifies the Great Connell and Old Connell as areas of risk and establishes further areas of risk within Flood Zones A & B. The Riverbanks Arts Centre is located outside of these zones and is therefore considered Flood Zone C. Please refer to the figure below page for extents of flood risk identified by the SFRA.

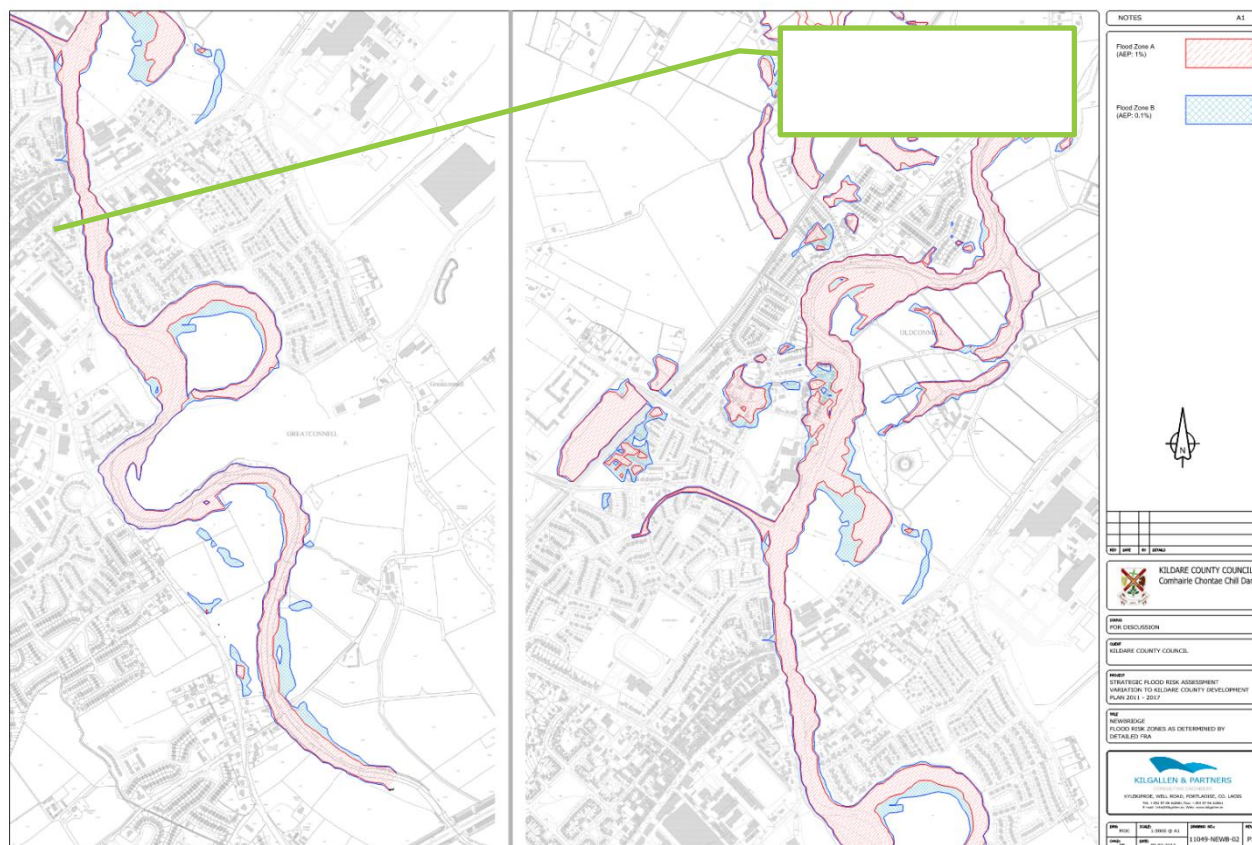


Figure 12 Newbridge Local Area Plan SFRA

Irish Coastal Protection Strategy Study (ICPSS)

After reviewing the ICPSS coastal flood extents maps, the subject site is outside the modelled flood extent for Fluvial and Coastal AEP events, i.e. the subject site is within Flood Zone C.

OPW Predictive, Historic & Benefitting Land Maps and Flood Risk Information

From consultation of flood information from the OPW's floodmaps.ie website the site has not suffered from flooding in the past. Information from this source on previous flood events has been included in Appendix A which shows some flooding incidents in other areas of the locality. However, there are no records of the site itself having been flooded. The flooding in

- Groundwater information from GSI -There is no record of evidence of groundwater flooding for the proposed site.
- Existing Local Authority Drainage Records - The surrounding area uses a number of separate drainage networks.
 - A 225mm diameter surface water sewer runs across the south of the site to the east discharging to the River Liffey.
 - A 225mm diameter foul sewer runs from south to north across the site.

3.3 Source-Pathway-Receptor Model

A Source-Pathway-Receptor model was produced to summarise the possible sources of floodwater, the people and assets (receptors) that could be affected by potential flooding (with specific reference to the proposals), see Table 3.2. It provides the probability and magnitude of the sources, the performance and response of pathways and the consequences to the receptors in the context of the mixed-use development proposal. These sources, pathways and receptors will be assessed further in the initial flood risk assessment stage.

Source	Pathway	Receptor	Likelihood	Impact	Risk
Tidal	Subject Site outside flood extents	Ground Floor/Basement	Very Unlikely	-	-
Fluvial	Proposed development site is within the 1 in 100 year flood zone, when not defended.	Ground Floor/Basement	Medium	Medium	Very Low
Surface Water Drainage	Flooding from surcharging of the developments drainage system	Ground Floor/Basement	Possible	Medium	Low
Groundwater Flooding (Pluvial)	Rising ground water on the site	Semi-Basement	Unlikely	-	Low
Infrastructural - Human or Mechanical Error	Blockage of new drainage network	Ground Floor/Basement	Possible but Unlikely	Low	Low

Table 3 - Source-Pathway-Receptor Analysis

The following section provides a summary of the results of this Source-Pathway-Receptor flooding model for the subject site.

3.4 Source-Pathway-Receptor Model Results

As it can be seen in the previous flooding analysis, the proposed development site is at very low risk for Pluvial flooding to the lower ground floor level from the raised road level on Liffey Terrace and Main Street to the western boundary.

Other low risks have been considered such as surcharging of the local drainage network or local infrastructure failure.

An initial flood risk assessment will follow to provide further detail on the causes, effects and possible mitigation measures for the source of flood risk identified above.

4 Stage 2- Initial Flood Risk Assessment Stage

The main sources of flood risk identified from Stage 1 are;

- A low risk of flooding from surcharging of the drainage system.
- A low risk of flooding from groundwater pluvial sources to the western boundary

The Initial Flood Risk assessment stage will look more closely how the proposed development will mitigate flood risk from the identified source.

In regards to the low pluvial flood risk, the initial flood risk assessment stage will assess this in relation to the following;

- Proposed development plans (FFLs, site vulnerability, building extents).
- Impact of proposed development on adjacent properties.
- In relation to the objectives set out in the Kildare County Council SFRA justification test.
- Any residual risks
- Flood exceedance.

As stated in section 1.5, the proposed development includes the part demolition of the existing Arts centre and the construction of a new auditorium and associated patron and services areas

4.1 Detailed Pluvial Flood Risk Assessment

The surface water strategy in the CORA Water Services Report outlines the design and storage capacity of the proposed SuDS systems are adequate to meet a 1 in 100 year rainfall event. Where this coincides with a fluvial flood event the local receiving drainage infrastructure may be surcharged and there is a risk that rainfall run-off cannot leave the site.

In this instance where the storage capacity has been met, the overflow from the roof level will discharge directly to the street level below.

The fall on the paving immediately adjacent to the building will be constructed with a fall away from the building. Surface water will be directed away from the building to the road side gullies via falls and curbing.

Existing and proposed street levels, surrounding topography, road curbing and localised ramps at the entrances will prevent any pluvial flood waters from entering the building.

4.2 Mitigation Measures

Proposed mitigation measures to address residual flood risk are summarised below;

- Following a topographical site survey it is evident that the surrounding streets are suitably sloped to allow over ground flows to be naturally directed away from the proposed building. The over ground routes are shown on the schematic plan below.
- Advanced warning systems such as alarms or notifications will be implemented where possible for staff and public to be alerted of any imminent flood warnings.
- The proposed drainage system to be maintained on a regular basis to reduce the risk of a blockage.

Effectiveness of Mitigation Measures

It is considered that the flood risk mitigation measures once fully implemented are sufficient to provide a suitable level of protection to the proposed development.

The proposed development will not increase the run-off rates when compared with the existing site and satisfies the requirement of the SFRA to reduce flooding and improve water quality.

5 Conclusion

This SSFRA concludes the following;

- This Site Specific Flood Risk Assessment for the proposed demolition of an existing garage unit and new construction at Riverbank Arts Theatre, Newbridge, Co. Kildare was undertaken in accordance with the requirements of the “Planning System and Flood Risk Management Guidelines for Planning Authorities”, November 2009 and the Kildare County Council Development Plan 2023-2029 Strategic Flood Risk Assessment and Newbridge Local Area Plan 2013-2019 SFRA.
- The proposed type of development for this site is to be Amenity and Commercial. Amenity and commercial are categorized as *Less Vulnerable Developments*.
- The proposed development site is within Flood Zone C for fluvial flooding.
- A possible source of flood risk from the surcharging or blockage of the development’s drainage system has been considered. This risk is mitigated by suitable design of the drainage network including regular maintenance and inspection of the network and establishment of exceedance overland flow routes.
- The development’s drainage design includes for a 30% climate change allowance.
- The proposed development will not increase the surface water run-off rate when compared with the existing site and satisfies the requirement of the SFRA to reduce flooding and improve water quality.

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Appendix A – Past Flood Events

MINUTES OF MEETING		
Reference:	P4D403A – F310 – 017 – 004- 002 Page 1 of 3	
Project No.:	P4D403A	
Project Title:	OPW Flood Hazard Mapping – Phase 1	
Purpose of Meeting:	Kildare County Council – Oral Report – Area Engineer – Kildare	
Participating:	Area Engineer Supervisor Search Manager	Kildare County Council Kildare County Council ESBI
Venue:	Kildare	
Date of Meeting:	30/03/05	
Copies to:		
Compiled by:	Search Manager ESBI	
Status	Draft	
Approved for ESBI:		
Approved for Kildare County Council		
Date:		

Meeting with Area Engineer for Kildare 30/03/05

The Area Engineer and his supervisor outlined 26 areas that are or were prone to flooding. These are: -

37. Monasterevin – Drain No 15 of the barrow drainage district floods after heavy rain. Road is liable to flooding
Flood Id = 1483
38. Rathgan – Flood plain of River Slate. Floods every year. 2 locations
Flood Id = 1484, Flood Id = 1485
39. Plunkerstown – Tributary of the river slate overflow is banks after heavy rain every year.
Flood Id = 1486
40. Kildare Town – Low lying area to the north of the town floods every year. A significant portion of the surface water drainage in Kildare town is piped to this location.
Flood Id = 1487
41. Nurney – Low lying area floods after exceptional heavy rain. Doesn't flood every year. Road is liable to flooding. No property is affected
Flood Id = 1488
42. Suncroft – Stream flowing along road overflows after heavy rain. Properties are affected. Council cleans streams every year
Flood Id = 1489
43. Baronstown West – Low lying area floods after heavy rain. There is inadequate drainage.
Flood Id = 1490
44. Kilbelin, Newbridge – Area floods after heavy rain. The surface water system not able to cope. Occurs 1 or 2 times per year.
Flood Id = 1491
45. Athgarvan to Kinneagh Cross Roads – Road is liable to flooding after heavy rain every year.
Flood Id = 1492
46. Kinneagh Cross Roads to Donnelly Cross Roads – Road is liable to flooding after heavy rain every year.
Flood Id = 1493
47. Miltown Road, Newbridge – Tributary of the Liffey overflows its banks after heavy rain. Housing in Lakeside Park and Mount Carmel are affected. Developer has undertaken some remedial work
Flood Id = 1494
48. Newbridge College, Newbridge – Flooding occurs at the junction of the stream in 47 and the Liffey after heavy rain.
Flood Id = 1495
49. Hosbery – Stream entering Liffey overflows its banks after heavy rain
Flood Id = 1496
50. Tankardsgarden – Low lying land floods after heavy rain every year due to inadequate drainage. Land has been raised and no flooding has subsequently occurred
Flood Id = 1497
51. Holy Well, Barretstown – Stream entering Liffey overflows its banks after heavy rain
Flood Id = 1498
52. Clongarey, Blacktrench and Derreens - Low lying land floods after heavy rain every year
Flood Id = 1499, Flood Id = 1500, Flood id = 1501

