

IMPROVEMENTS TO PUBLIC REALM TO BRIDGE STREET AND LANDS TO THE REAR AND SIDE OF THE GRAIN STORE, JOHN STREET, NEW ROSS, CO. WEXFORD

SITE SPECIFIC FLOOD RISK ASSESSMENT

Prepared for:

Wexford County Council



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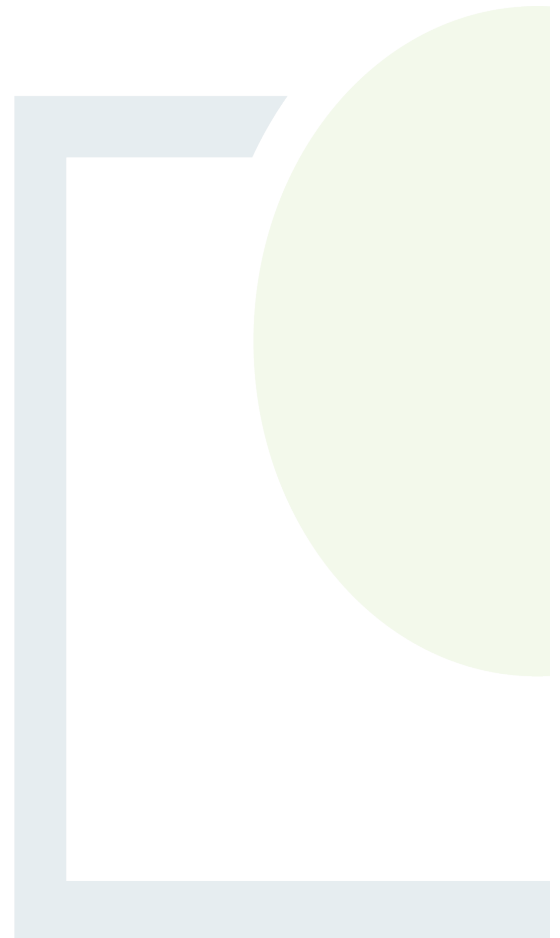
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Abstract: Fehily Timoney and Company is pleased to submit this Site-Specific Flood Risk Assessment to Wexford County Council on John Street Grain Store, New Ross, County Wexford.

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1. INTRODUCTION

Fehily Timoney and Company (FT) were commissioned by Wexford County Council (WCC) to carry out a Site-Specific Flood Risk Assessment for the proposed Improvements to Public Realm at Bridge Street and lands to the rear and side of the Grain Store, John Street, New Ross, Co. Wexford (herein referred to as the “proposed development” or “site”).

1.1 Description of the Proposed Development

The proposed development is located to the rear of the Grain Store, John Street (R700) in New Ross, County Wexford. The site c. 0.185ha and is located within the medieval walled town of New Ross, adjacent to the River Barrow and upstream of the crossing point to Rosbercon, County Wexford. Refer to Figure 1-1.



Figure 1-1: Site Location

The proposed development is bordered by the John Street carpark to the north, the Grain Store and John Street to the east, Bridge Street to the south and the River Barrow to the west. O' Hanrahan Bridge (R723) is located c. 120 m south of the proposed development. The profile of the site is generally flat with a slight downward slope towards the River Barrow.



The aim of the proposed development is to breathe new life into this area of New Ross town. The proposed development will improve pedestrian connectivity and permeability and will activate and connect further sections of the river frontage which currently are underutilised and inaccessible to the public.

The proposed development will attract the local community and will function as a catalyst for further development in the immediate area which will bring this area of New Ross back to life.

The site includes two new main pedestrian access routes to serve this space. A gently sloped pedestrian access route along the riverside connects the plaza to Bridge Street while tiered external stairs and landscaping connects the plaza to John Street.

These new access routes will aid pedestrian permeability in this area of New Ross. The new plaza is proposed as the main focal point and is of a scale that will enable multi-functional uses. The connections and plaza space will greatly improve the public realm and are all designed to provide natural and efficient wayfinding and orientation. As part of the proposed works, it will be necessary to lower the stone wall between the yard area and the river to facilitate these improvements. Although this boundary wall does not constitute a formal flood defence, it currently provides a degree of protection against flooding from the River Barrow.

1.2 Purpose of the Report

The objectives of this Site Specific-Flood Risk Assessment are to:

- Identify all potential sources of flooding affecting the proposed development.
- Establish the design flood levels and delineate the Flood Zones.
- Establish the design flood level required to determine the crest level of the masonry wall proposed to be lowered.
- Confirm the vulnerability classification of the proposed development and assess its appropriateness in accordance with the Guidelines.
- Identify residual flood risks and the measures required to manage them.
- Determine whether a Stage 3 Detailed Flood Risk Assessment is required.
- Establish the flood risk criteria and requirements that the proposed drainage design must satisfy.



2. FLOOD RISK ASSESSMENT METHODOLOGY

2.1 General

The Guidelines for Planning Authorities and its Technical Appendices outline the requirements for a SSFRA. The Guidelines for Planning Authorities requires that works:

- Avoid development in areas at risk of flooding.
- Substitute less vulnerable uses where avoidance is not possible.
- Mitigate and manage the risk where avoidance and substitution are not possible.

The key principles of the Guidelines for Planning Authorities apply the Sequential Approach to the planning process. Figure 2-1 of this report describes the mechanism of the sequential approach for use in the planning process.

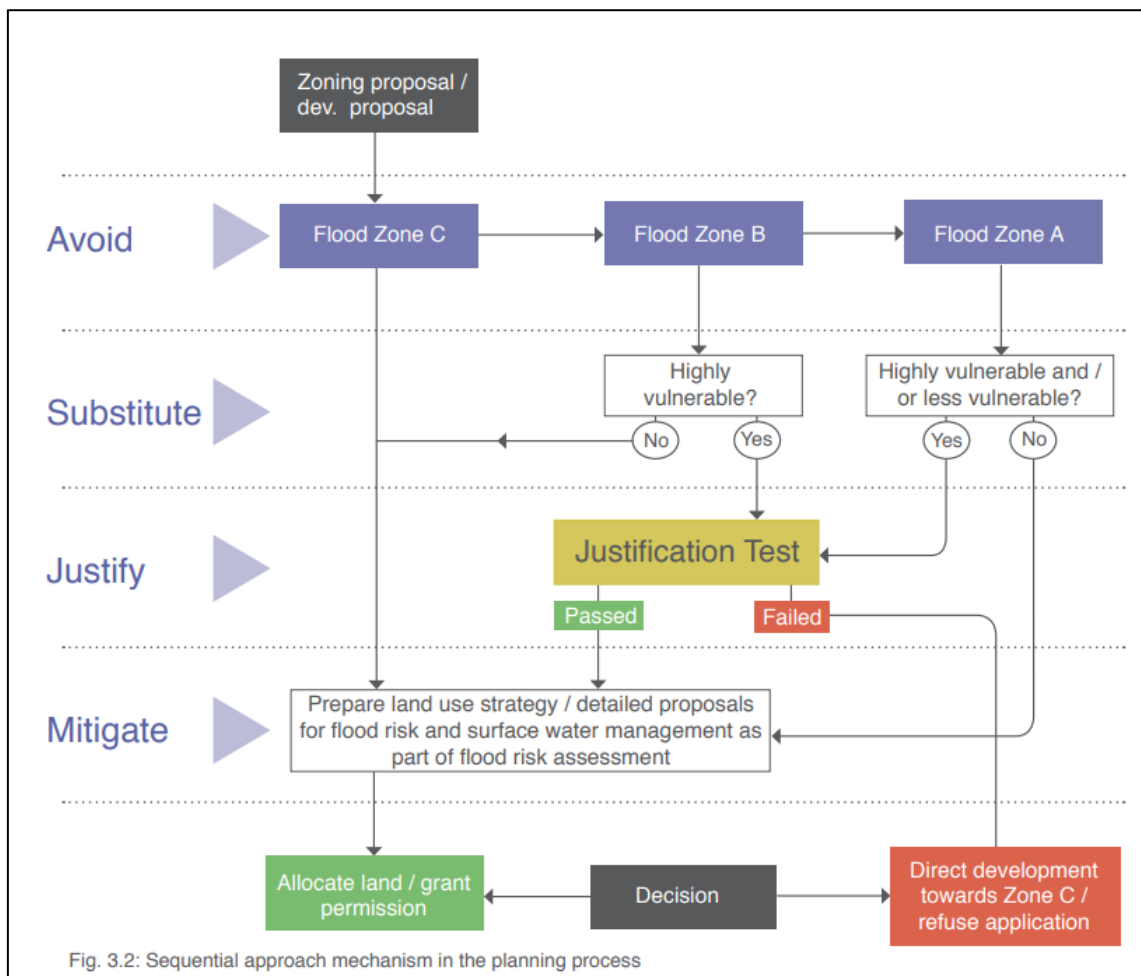


Figure 2-1: Sequential Approach Mechanism¹

¹ Figure 3.2 of the *Guidelines for Planning Authorities*.



2.2 Source-Pathway-Receptor Model

The assessment of flood risk requires a thorough understanding of the following:

- The sources of flood water (e.g., high sea levels, intense or prolonged rainfall leading to runoff and increased flow in rivers and sewers)
- The pathways by which the flood water reaches those receptors (e.g., river channels, river and coastal floodplains, drains, sewers and overland flow).
- The people and assets affected by flooding (known as the receptors).

The Source-Pathway-Receptor (S-P-R) Model illustrated in Figure 2-2 has become widely used to assess and inform the management of environmental risks.

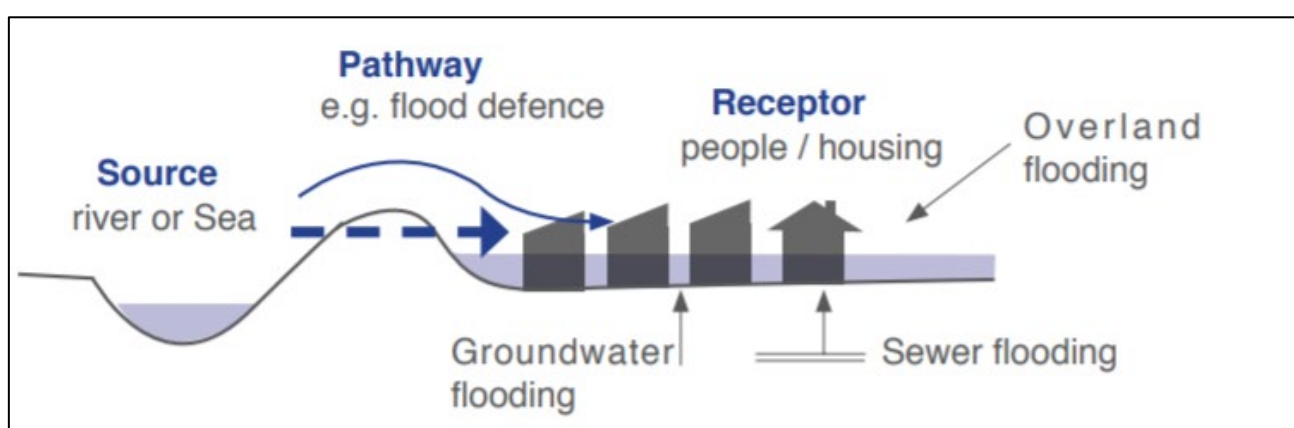


Figure 2-2: Source-Pathway- Receptor Model²

2.3 Likelihood of Flooding and Definition of Flood Zones

The Guidelines for Planning Authorities define the likelihood of flooding as the percentage probability of a flood of a given magnitude occurring or being exceeded in any given year. The likelihood of flooding is expressed as a return period or annual exceedance probability (AEP).

Flood Zones are graphical areas within which the likelihood of flooding is in a particular range. They are a key tool in flood risk management within the planning process as well as in flood warning and emergency planning. The Guidelines for Planning Authorities split these flood zones into three categories:

- Flood Zone A – where the probability of flooding from rivers and the sea is high (greater than 1% AEP for river flooding or 0.5% AEP for coastal flooding).
- Flood Zone B – where the probability of flooding from rivers and the sea is moderate (between 0.1% AEP and 1% AEP for river flooding and between 0.1% AEP and 0.5% AEP for coastal flooding).
- Flood Zone C – where the probability of flooding from rivers and the sea is low (less than 0.1% AEP for both river and coastal flooding).

² Source: Fig 2.2 of the *Guidelines for Planning Authorities*.



2.4 Classification of the Proposed Development and Justification Test

The Guidelines for Planning Authorities categorises all types of development as either:

- Highly Vulnerable (garda, ambulances, schools, hospitals, dwelling houses, student halls...).
- Less Vulnerable (buildings used for: retail leisure, warehousing, commercial, industrial, and non-residential institutions,).
- Water Compatible (flood control infrastructure, docks, marinas, amenity open spaces...).

The Guidelines classify potential development in terms of its vulnerability to flooding. The types of development falling within each vulnerability class are described in Table 2.1 of the Guidelines.

Table 2-1: Vulnerability Class³

Highly vulnerable development (Including essential infrastructure)	Garda, ambulances, fire stations and command centres required to be operational during flooding. Hospitals. Emergency access and egress points. Schools. Dwelling houses, student halls of residence and hostels. Residential institutions such as residential care homes, children's homes and social services homes. Caravans and mobile home parks. Dwelling houses designed, constructed or adapted for the elderly or, other people with impaired mobility. Essential infrastructure, such as primary transport and utilities distribution, including electricity generating power stations and sub-stations, water and sewage treatment, and potential significant sources of pollution (SEVESO sites, IPPC sites, etc.) in the event of flooding.
Less vulnerable development	Buildings used for: retail, leisure, warehousing, commercial, industrial and non-residential institutions. Land and buildings used for holiday or short-let caravans and camping, subject to specific warning and evacuation plans. Land and buildings used for agriculture and forestry. Waste treatment (except landfill and hazardous waste). Mineral working and processing. Local transport infrastructure.

³ Source: Table 3.1 of the *Guidelines for Planning Authorities*.



Water-compatible development	Flood control infrastructure. Docks, marinas and wharves. Navigation facilities. Ship building, repairing and dismantling, dockside fish processing and refrigeration and compatible activities requiring a waterside location. Water-based recreation and tourism (excluding sleeping accommodation). Lifeguard and coastguard stations. Amenity open space, outdoor sports and recreation and essential facilities such as changing rooms. Essential ancillary sleeping or residential accommodation for staff required by uses in this category (subject to a specific warning and evacuation plan).
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*Uses which are not listed in the table should be considered on their own merits.

The Sequential Approach restricts development types to occur within the flood zone appropriate to their respective vulnerability classes. Table 2-2 identifies the types of development appropriate for each flood zone and those that will require a Justification Test.

Table 2-2: Matrix of Vulnerability Versus Flood Zone⁴

	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

The Justification Test has been designed to rigorously assess the appropriateness of developments that are being considered in areas of moderate or high flood risk. There are two types of Justification Tests:

- The first is the Plan-making Justification Test which is used at the plan preparation and adoption stage where it is intended to zone or otherwise designate land which is at moderate or high risk of flooding.
- The second is the Development Management Justification Test which is used at the planning application stage where it is intended to develop land at moderate or high risk of flooding for uses or development vulnerable to flooding that would generally be inappropriate for that land.

⁴ Source: Table 3.2 of the *Guidelines for Planning Authorities*.



3. EXISTING SITE

This section describes the proposed development site, including watercourses, geology, and wider geographical area.

3.1 Location

The proposed development is located in the town of New Ross, on the eastern side of the River Barrow. The site is bounded by the following:

- Car park to the north.
- Bridge Street to the south, where retail and residential properties, together with a car park, are located.
- John Street to the east.
- River Barrow to the west.

3.2 Watercourses

The site is located on the left bank of the River Barrow. The River Barrow is 192km long and has a catchment area of 3,067m².

3.3 Site Geology

The geological maps of the site, provided by the Geological Survey of Ireland (GSI) have been reviewed. The subsoil is urban (made ground). The underlying rock formation is the Ballylane Shale Formation and the Oaklands Formation.



Figure 3-1: Quaternary Sediments Map

3.4 Topography

The topographical survey completed for the site by Murphy Geospatial in December 2022 indicates a steep fall from approximately 8.9 m OD at John Street to approximately 2.45 m OD along the River Barrow boundary. The open land situated behind the existing walls is relatively low-lying and generally level, with ground levels ranging between approximately 2.4 m OD and 3.3 m OD, with the lowest elevations located adjacent to the river boundary.

3.5 Existing walls

The boundary between the river and the site is formed by two consecutive wall types. The southern section comprises the OPW flood wall, which forms part of the New Ross Flood Relief Scheme. The northern section consists of an older masonry wall, which does not function as a formal flood defence.



Figure 3-2: Boundary Wall and Flood Defence Outlines

Table 3-1: Existing Walls

Existing Wall	Status	Length (m)	Surveyed top of wall (m OD)	Surveyed lowest top of wall (m OD)
OPW Flood Defence	Formal flood defence wall (New Ross Flood Relief Scheme)	33.60	4.09	3.89
Masonry Wall	Boundary Wall	40.60	4.13, 4.75, 4.96, 5.12, 5.33, 5.44, 6.43	4.13



4. SURFACE WATER MANAGEMENT

The drainage design (refer to Drainage Planning Report by Brunner Consulting Engineers) must meet the following flood risk requirements:

- Reverse flow: a non-return valve shall be installed at the network outfall to River Barrow. The valve shall prevent river water from backing up into the drainage network and shall protect the connection between the existing and proposed drainage systems, as well as the Class 1 hydrocarbon interceptor.
- Tide-locking: during periods of high-water levels in the River Barrow, the non-return valve will close, preventing discharge from the drainage network. The network shall therefore be designed to provide sufficient storage, or pumping facilities where required, to accommodate runoff during tide-locked conditions without causing ponding within the plaza. The design storm event should be assessed in conjunction with elevated river water levels.
- External inflows: the drainage network shall accommodate runoff from the plaza, the Grain Store roof and associated hardstanding areas, together with runoff from the third-party roofs
- Exceedance flows from Bridge Street: Drawing J08-P-11 indicates that overland flows may enter the plaza from Bridge Street during surcharge conditions within the public drainage system. The design shall manage these flows and ensure that exceedance flows are routed away from the proposed development.
- Standards: the drainage design shall comply with current industry standards and guidance, including the Greater Dublin Strategic Drainage Study (GDSDS), the CIRIA SuDS Manual (C753), and the relevant objectives of the Wexford County Development Plan, namely FRM07, FRM14 and SWM01-SWM08. The design shall also incorporate the rainfall climate change allowance required by Wexford County Council.
- Maintenance: the non-return valve, Class 1 hydrocarbon interceptor and slot drains shall be subject to a planned inspection and maintenance regime, including inspections following flood events, to ensure their continued effectiveness and operation.

The Wexford County Development Plan (CDP) 2022-2028 provides a framework for the planning and sustainable development of the county.

Variation No. 1 to the Wexford County Development Plan came into effect on 13 July 2026. The primary purpose of the variation was to update the County Development Plan to reflect revised national housing requirements and to provide interim land-use zoning provisions for towns whose previous statutory plans had expired. This included New Ross Town, for which zoning provisions were incorporated into the County Development Plan. Figure 5-1 below shows the land use zoning for New Ross Town.





The proposed development is located on lands zoned Town Centre (TC). The objective of this zoning is to provide for, protect, and strengthen the vitality and viability of the town centre through the consolidation of development, the maximisation of land use, and the encouragement of a mix of compatible uses. The zoning also seeks to promote the redevelopment of brownfield sites, infill sites, and underutilised lands and buildings. The full use of existing buildings and backlands is encouraged.

The approach to flood risk management is set out in Chapter 9, Infrastructure Strategy, of Volume 1: Written Statement and Volume 11: Strategic Flood Risk Assessment. As part of Variation No. 1 of the Wexford County Development Plan 2022-2028, an addendum to the existing SFRA was prepared. The purpose of this addendum was to provide an updated SFRA for New Ross and Enniscorthy, incorporating the most up-to-date datasets available from the Office of Public Works (OPW), the CFRAM Programme, Flood Relief Schemes, and national indicative flood mapping. The addendum also informs land use zoning decisions in accordance with The Planning System and Flood Risk Management Guidelines for Planning Authorities.

The following CDP objectives are relevant to this site:

FRM07: To ensure that all future development proposals comply with the requirements of the Planning System and Flood Risk Management –Guidelines for Planning Authorities (DEHLG and OPW, 2009) and Circular PL2/2014, in particular through the application of the sequential approach and the Development Management Justification Test.

FRM08: When potential flood risk is identified in either Flood Zone A, B or C, the Planning Authority will require the applicant to submit an appropriately detailed site-specific flood risk assessment.

FRM011: To facilitate the provision of new, or the reinforcement of existing flood defences and protection measures where necessary, and in particular to support the implementation of proposed flood schemes being progressed through the planning process during the lifetime of the Wexford County Development Plan 2022-2028

FRM14, SWM01. To require the use of sustainable drainage systems (SuDS) and nature-based solutions (NBS) to minimise and limit the extent of hard surfacing and paving and require the use of sustainable drainage and nature-based techniques where appropriate.

Figure 5-2 below shows the Flood Zones and Defended Areas within New Ross. As illustrated, the proposed development lies within Flood Zones A and B and is located within a defended area.

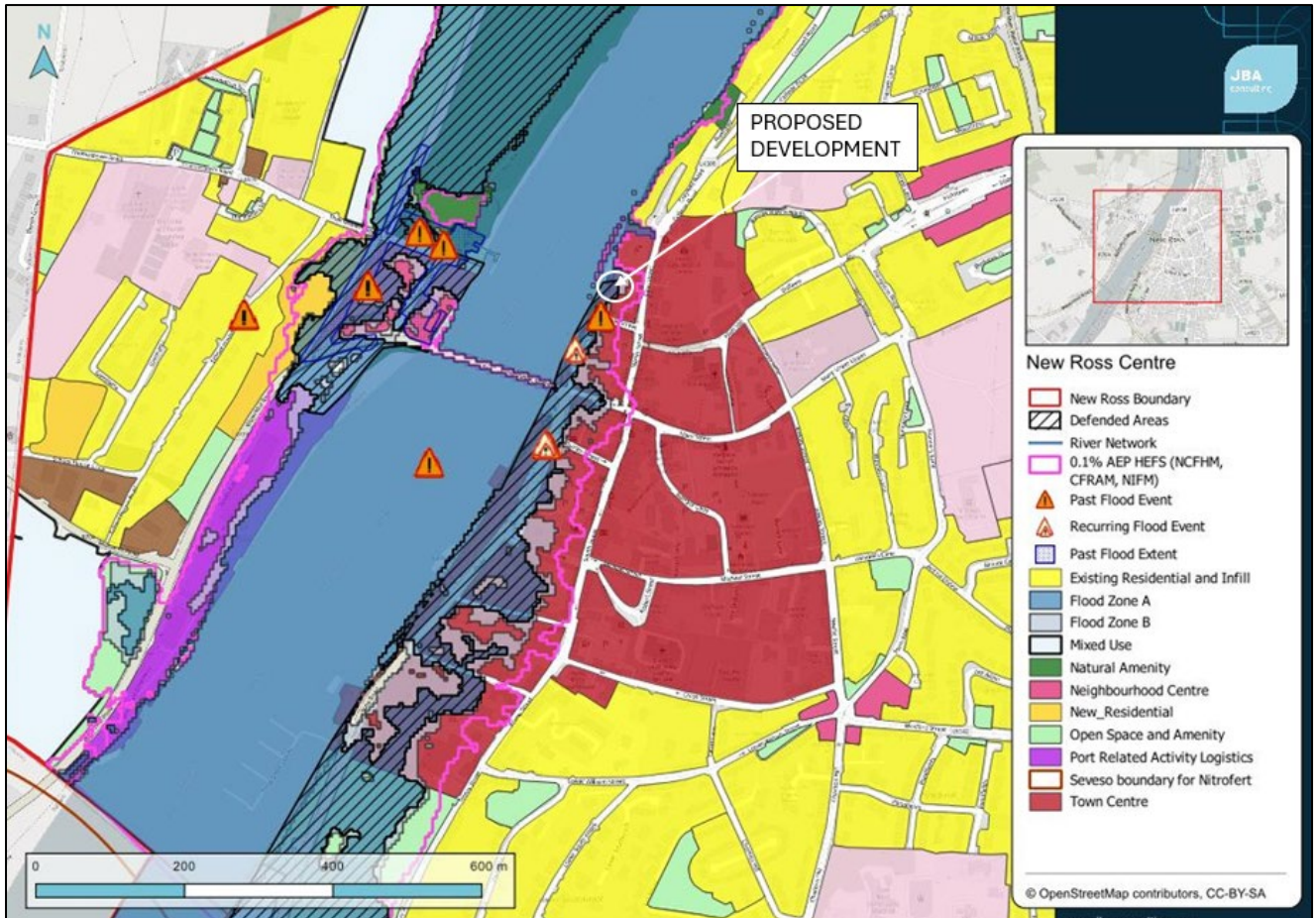


Figure 5-2: New Ross Town-Flood Zones (Source: SFRA CDP 2022-2028)



6. STAGE 1-FLOOD RISK IDENTIFICATION

The purpose of this stage is to identify whether there may be any flooding or surface water management issues related to the proposed development that may require further investigation.

6.1 Areas for Further Assessment (AFA)

The National Catchment Flood Risk Management (CFRAM) Programme has examined the flood risk, and potential mitigation measures to address it in 300 communities throughout the country at potentially significant flood risk. These communities were identified through the Preliminary Flood Risk assessment (PFRA), which was a national screening assessment of flood risk. The communities recognized as being at a significant flood risk are called Areas for Further Assessment (AFA). For the AFAs a detailed hydraulic modelling has been carried out to produce indicative flood maps (CFRAM Maps).

New Ross Town and its environs—including the proposed development—are located within an Area for Further Assessment (AFA), and therefore flood maps have been produced as part of the CFRAM study.

6.2 Coastal Flooding

The Proposed Development is within CFRAM Study Area for Coastal Flooding. The ground levels within the site varies between 8.75 mOD and 2.42 mOD. The site is located approximately 25km from sea.

CFRAM Study indicates that, the subject site is susceptible to flooding during the 0.5 % & 0.1 % AEP.

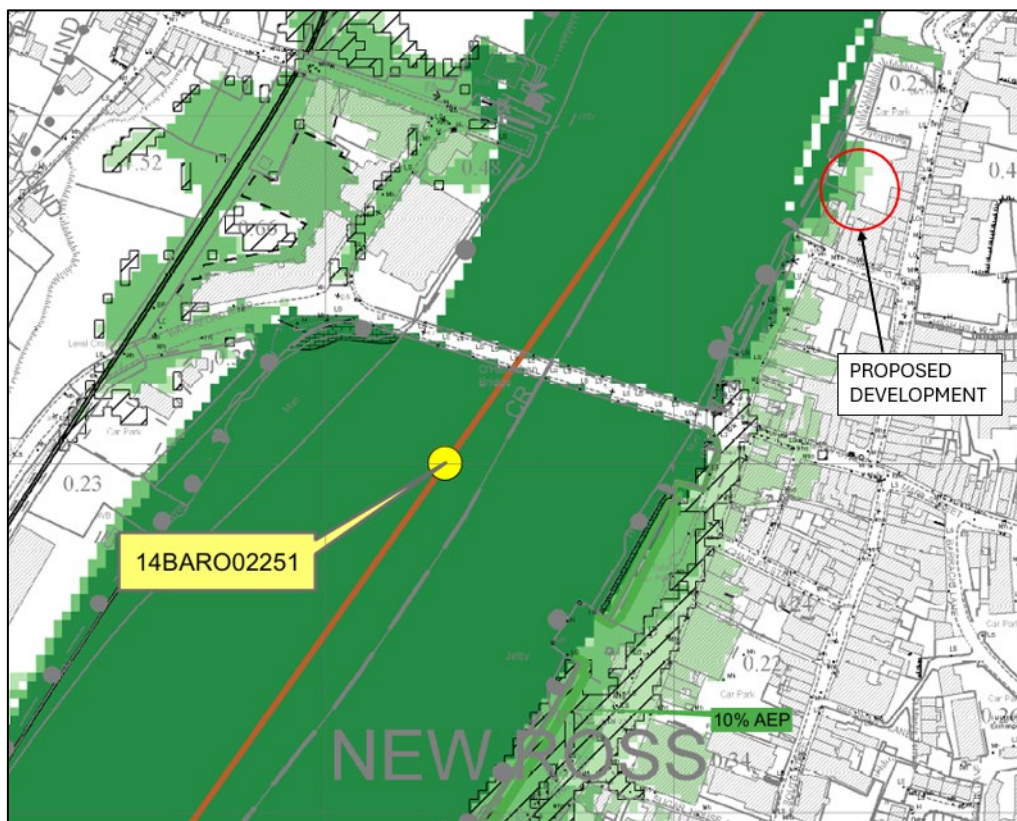


Figure 6-1: CFRAM Flood Map-Coastal Flooding-Current Scenario



6.3 Groundwater Flooding

There is no record of historic groundwater flooding in the area. Similarly, there were no predictive groundwater flooding extents identified on-site or nearby. Tidal seepage through made ground is possible but it has not been recorded.

6.4 Fluvial Flooding

The proposed development is within the CFRAM Study Area for Fluvial Flooding.

The CFRAM Study indicates that, the subject site is susceptible to flooding during the 1 % & 0.1 % AEP.

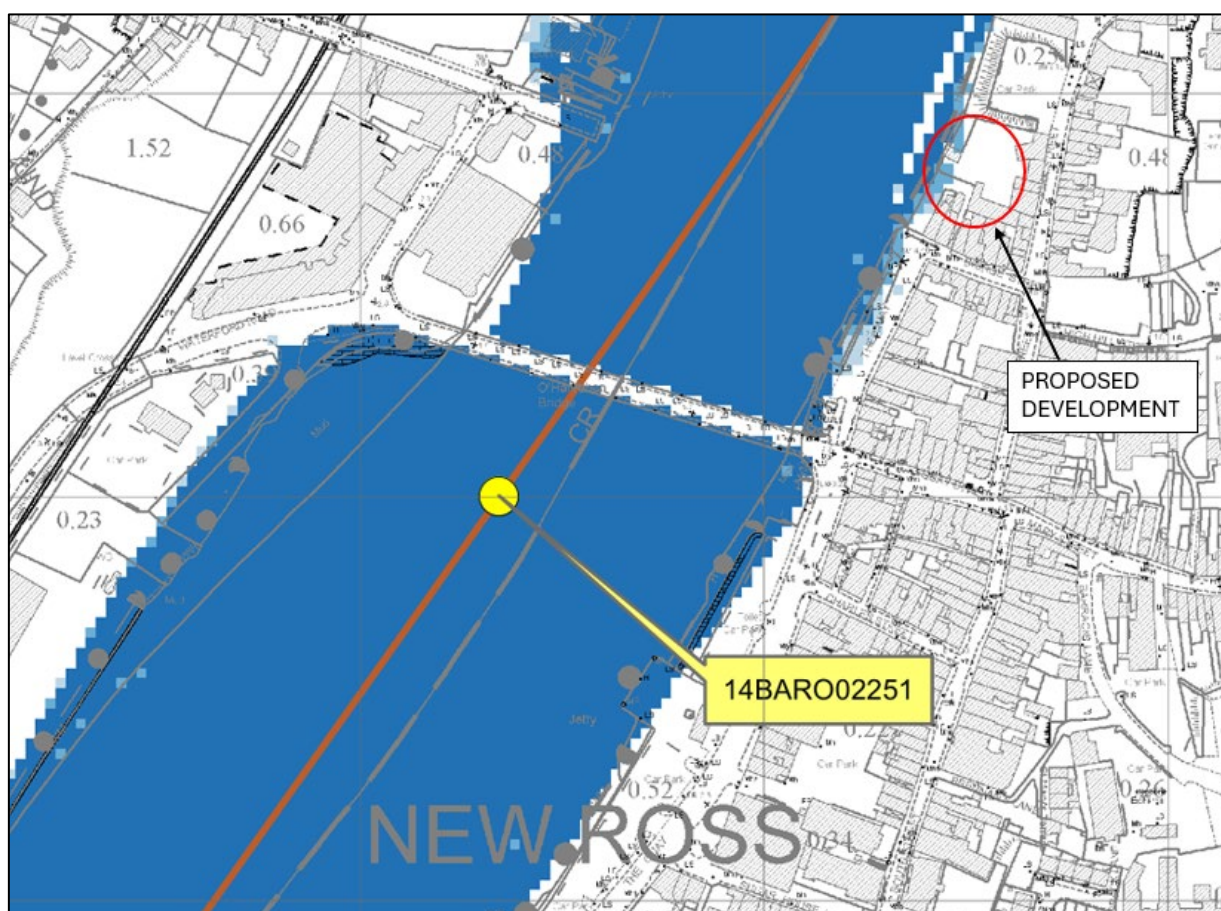


Figure 6-2: CFRAM Flood Map-Fluvial Flooding-Current Scenario

6.5 Pluvial Flooding

The proposed plaza is located at a low point and receives rainfall runoff from surrounding building roofs and, during significant rainfall events, overland flow from Bridge Street (Drawing J08-P-11). In addition, the surface water drainage outfall discharges to the River Barrow; therefore, elevated river levels may impede discharge or cause reverse flow within the drainage network, resulting in pluvial flooding within the site.



6.6 Historical Flooding

The National Flood Hazard Mapping (www.floodmaps.ie) indicates that there are records of historical flooding in the vicinity of the proposed development, as well as in other nearby areas of New Ross Town.



Figure 6-3: Past Flood Event (Map taken from www.floodmaps.ie)

Table 6-1: Records of Past Flood Events

Date	Record	Flooding Source	Summary
15 August 2022	Media reports (as cited in the JBA FRA)	Pluvial	Approximately 40 mm of rain in one hour; overland flow and debris from High Hill across John Street and Bridge Street.
6 January 2014	Flood ID 12170	Tidal	Tidal flooding at New Ross.
2 February 2014	Media reports (as cited in the JBA FRA)	Tidal and rainfall	High tides, strong winds and heavy rain; homes, businesses and cars affected.
October 2004	Flood ID 3006	Tidal	Flooding about 300 mm deep along the quays, including the N25.



Date	Record	Flooding Source	Summary
February 2002	Flood ID 3006	Tidal surge	Southerly gales coinciding with a high spring tide; commercial property on the quays damaged.
October 2001	Flood ID 4819	Tidal	High tides flooding the quays to about 300 mm.

There are no records confirming flooding of the proposed development site. Most of the reported flood events occurred prior to the completion of the New Ross Flood Relief Scheme.

6.7 Conclusion Stage 1

Having regard to all of the information sources outlined above, it is considered that the proposed development could be subject to potential flood risk issues and therefore the assessment should proceed to Stage 2.



7. STAGE 2- INITIAL FLOOD RISK ASSESSMENT

The purpose of this stage is to confirm sources of flooding that may affect the development site, to appraise the adequacy of existing information and to determine complexity of the flood risk issues. This stage involves the review of data addressed in Stage 1. Based on the information recorded in Stage 1, it has been determined that the Site is at risk of coastal and fluvial flooding and is located within Flood Zone A and B.

The CFRAM maps present the flood levels and flows adopted in the hydraulic model for the fluvial flood scenario. For the coastal flood scenario, the maps separately present the resulting flood levels. Both hydraulic assessments were undertaken for the current-day scenario. To determine the required crest level of the existing wall, should it be reduced, each flood scenario should be assessed and, where appropriate, in combination using the relevant AEP events. The assessment should also account for the effects of climate change to identify the design flood level and the minimum level of protection required.

The proposed development comprises a public plaza and open space, which is classified as water-compatible development. Accordingly, it is considered appropriate within these flood zones in accordance with the Planning System and Flood Risk Management Guidelines.

Table 7-1: Matrix of Vulnerability Versus Flood Zone - Case of Study

	Flood Zone A	Flood Zone B	Flood Zone C
Highly Vulnerable Development	Justification Test	Justification Test	Appropriate
Less Vulnerable Development	Justification Test	Appropriate	Appropriate
Water-Compatible Development	Appropriate	Appropriate	Appropriate

A Stage 3 Detailed Flood Risk Assessment will be undertaken to determine flood levels and flood extents for a range of fluvial and coastal flood events, taking account of the effects of climate change. The assessment will also establish the minimum crest level required for the wall.



8. STAGE 3 - DETAILED FLOOD RISK ASSESSMENT

As part of the Site-Specific Flood Risk Assessment, hydrological and hydraulic analysis was undertaken along the specific reach of the Hydrological Feature; this enabled the delineation of appropriate flood zones, provide information on flood depth for various flood events and determine the crest level of the wall required.

The hydraulic modelling undertaken estimated the peak flood flows along the River Barrow. Figure 8-1 below shows the location of the subject site adjacent to the River Barrow. The estimated peak flows, in conjunction with a digital terrain model (DTM) and a topographical survey of the existing site where the proposed development will be located were used to generate flood extent and flood depth maps for 1% AEP (annual exceedance probability) and 0.1%AEP.



Figure 8-1: River Barrow-Location of the Proposed Development

8.1 Hydrology Analysis

The site lies within an ungauged catchment; therefore, flow estimation must rely on ungauged methods. Given the large upstream catchment area of approximately 3,067 km², it is not practical to estimate peak flows at a specific river point using only catchment descriptors, as these values are derived at a point or regional scale. Applying such values to a catchment of this size would likely introduce significant errors and lead to unreliable results.



Since the project site is located within an Area for Further Assessment (AFA), a CFRAM study has already been carried out for the relevant river reach. Consequently, the CFRAM flows have been adopted for use in the hydraulic modelling as a more reliable alternative.

The CFRAM Study assessed flood risk from pluvial, fluvial, and coastal sources. In the vicinity of the proposed development site, CFRAM fluvial flow estimates are available for the Current Scenario. Accordingly, CFRAM Reference Node 14BARO02251, located downstream of and in close proximity to the site, has been adopted for the hydraulic assessment. As the river is tidally influenced, water level data from the CFRAM Study have also been used to define the downstream boundary conditions. Therefore, the potential effects of both fluvial and coastal flood sources have been incorporated into the assessment. The CFRAM Reference Node used for the water levels is 14BARO02159 for the Current Scenario which is approximately at the downstream end of the model.

The analysis is undertaken to simulate potential flooding events and to generate Flood Zone A and Flood Zone B extents corresponding to Annual Exceedance Probabilities (AEP) of 1% and 0.1%, including the effects for climate change.

Two separate hydrological scenarios were considered, reflecting the tidal influence on the River Barrow:

- A scenario where extreme events from coastal and fluvial flooding have been considered
- A scenario where fluvial flooding is the predominant source of flood risk.

As outlined in the Southeastern CFRAM Study Hydrology Report, a joint probability analysis was undertaken using the available data to assess the dependency between extreme coastal and fluvial events. The analysis indicated that there is limited dependence between the factors influencing fluvial flooding and those influencing coastal flooding. However, some degree of dependence still exists and, given that the River Barrow is tidally influenced along this reach, both fluvial and coastal events have been considered within each modelling scenario with different AEP.

Table 8-1: Scenario 1-Fluvial & Coastal Extreme Events-Flows

AEP	Flow in m ³ /s	Flow in m ³ /s with 20% CC
1 % AEP	1121.97	1346.364
0.1% AEP	1453.09	1743.708

Table 8-2: Scenario 1-Fluvial & Coastal Extreme Events-Water Levels

AEP	Water Level (mOD)	Water Level (CC) (+0.5 m)
0.5 % AEP	2.90	3.40
0.1% AEP	3.01	3.51



Table 8-3: Scenario 2-Fluvial dominant event-Flows

AEP	Flow in m3/s	Flow in m3/s with 20% CC
1 % AEP	1121.97	1346.364
0.1% AEP	1453.09	1743.708

Table 8-4: Scenario 2-Fluvial dominant event-Water Levels

AEP	Water Level (mOD)	Water Level (CC) (+0.5 m)
1 % AEP	2.56	3.06
0.1% AEP	2.60	3.10

The water levels adopted for the fluvial scenario were obtained from the Current Scenario Fluvial CFRAM flood mapping. The Annual Exceedance Probability (AEP) associated with the coastal conditions applied in this fluvial-dominated scenario is not known. However, it has been assumed that a degree of coastal influence was incorporated into the CFRAM modelling and that the resulting water levels are therefore influenced by tidal conditions. Therefore, it is considered that this scenario is slightly more conservative than the original modelled developed for the CFRAM.

The Scenario 1 in which fluvial and coastal are considered represents a highly conservative assessment, as it assumes that extreme fluvial and coastal events occur simultaneously. As noted in the Southeastern CFRAM Study Hydrology Report and as stated above, this would be considered a rare occurrence. Nevertheless, this scenario has been assessed to provide a conservative estimate of flood risk and to account for the tidal influence on the River Barrow.

8.2 Hydraulic Analysis

A flood model of the stream in the vicinity of the subject site was constructed using the software package HEC-RAS. This software was developed by the Hydraulic Engineering Centre of the US Army Corps of Engineers.

The primary inputs into the HEC-RAS Model are summarised below:

- Geometric Data:
 - a) Stream- channel cross sections and overbanks. OPW Cross Sectional Survey Data (June 2012-October 2013) and LIDAR Coverage OPW (2011).
- Inflow Data - Coastal and Fluvial CFRAM Maps-Current Scenario:
 - Flows for 1% AEP + 20% CC and 0.1% AEP +20% CC.
 - Water Levels for 1%, 0.5% and 0.1% AEP (+0.5 m for climate change).
- Boundary Conditions:
 - The design flows will be applied as the upstream boundary condition, while the corresponding water levels will be applied as the downstream boundary condition.



The Manning's values for the river channel and overbanks were determined by identifying the different type of materials encountered from site photos of the area; this assisted in selecting the appropriate manning's coefficient from the Hec-Ras Reference Manual. The contraction and expansion coefficients utilized were likewise drawn from the recommendations of the same manual.

Table 8-5: Design parameters used in the Hydraulic Analysis.

Parameter	Value	Origin
Manning's Value (Channel)	0.04	Hec-Ras Reference Manual
Manning's Value (Flood Plain)	0.02	Hec-Ras Reference Manual
Contraction Coefficient	0.1 0.3 (Bridge)	Hec-Ras Reference Manual
Expansion Coefficient	0.3 0.5 (Bridge)	Hec-Ras Reference Manual

Separate hydraulic models were developed for each hydrological scenario and the different Flood Zones. The models provided water level, flood extent, and flow velocity outputs at various locations within the river channel and adjacent floodplain areas, both upstream and downstream of the proposed development site and along the proposed development footprint.

There is an existing wall currently protecting the site, the height of which varies along its length. In addition, there are other walls located further downstream that act as flood defences and provide protection to the inland areas. However, in accordance with The Planning System and Flood Risk Management Guidelines for Planning Authorities, while these structures reduce flood risk, a residual risk of flooding remains. Consequently, flooding must still be considered in areas located behind such defences. Therefore, the flood zones presented below have been derived without taking these flood defence walls into account.

8.2.1 Scenario 1- Fluvial & Coastal Extreme Events

Flood Zone A

A hydraulic model was developed for the 1% AEP fluvial event and the 0.5% AEP coastal event, incorporating the effects of climate change. Fluvial flows were applied as model inputs, while coastal water levels were used as the downstream boundary condition. Table 8-6 below shows the water levels, flows and velocities across the proposed development.

Table 8-6: Water Levels-Proposed Development (1% AEP Fluvial and 0.5% AEP Coastal)

Cross Section	Water Surface Elevation (m OD)	Flow (m ³ /s)	Velocity (m/s)
2569	3.46	1346.4	0.84
2553	3.46	1346.4	0.83
2543	3.46	1346.4	0.83
2526	3.45	1346.4	0.84
2514	3.45	1346.4	0.84



Figure 8-2: Flood Zone A

Flood Zone B

A hydraulic model was also developed for the 0.1% AEP fluvial event and the 0.1% AEP coastal event, incorporating the effects of climate change. Fluvial flows and coastal water levels were applied in the same manner as in the hydraulic model used to define Flood Zone A. Table 8-7 below presents the water levels, flow rates, and velocities predicted across the proposed development site.

Table 8-7: Water Levels-Proposed Development (0.1% AEP Fluvial and 0.1% AEP Coastal)

Cross Section	Water Surface Elevation (m OD)	Flow (m ³ /s)	Velocity (m/s)
2569	3.60	1743.7	1.06
2553	3.60	1743.7	1.05
2543	3.60	1743.7	1.05
2526	3.60	1743.7	1.05
2514	3.59	1743.7	1.06

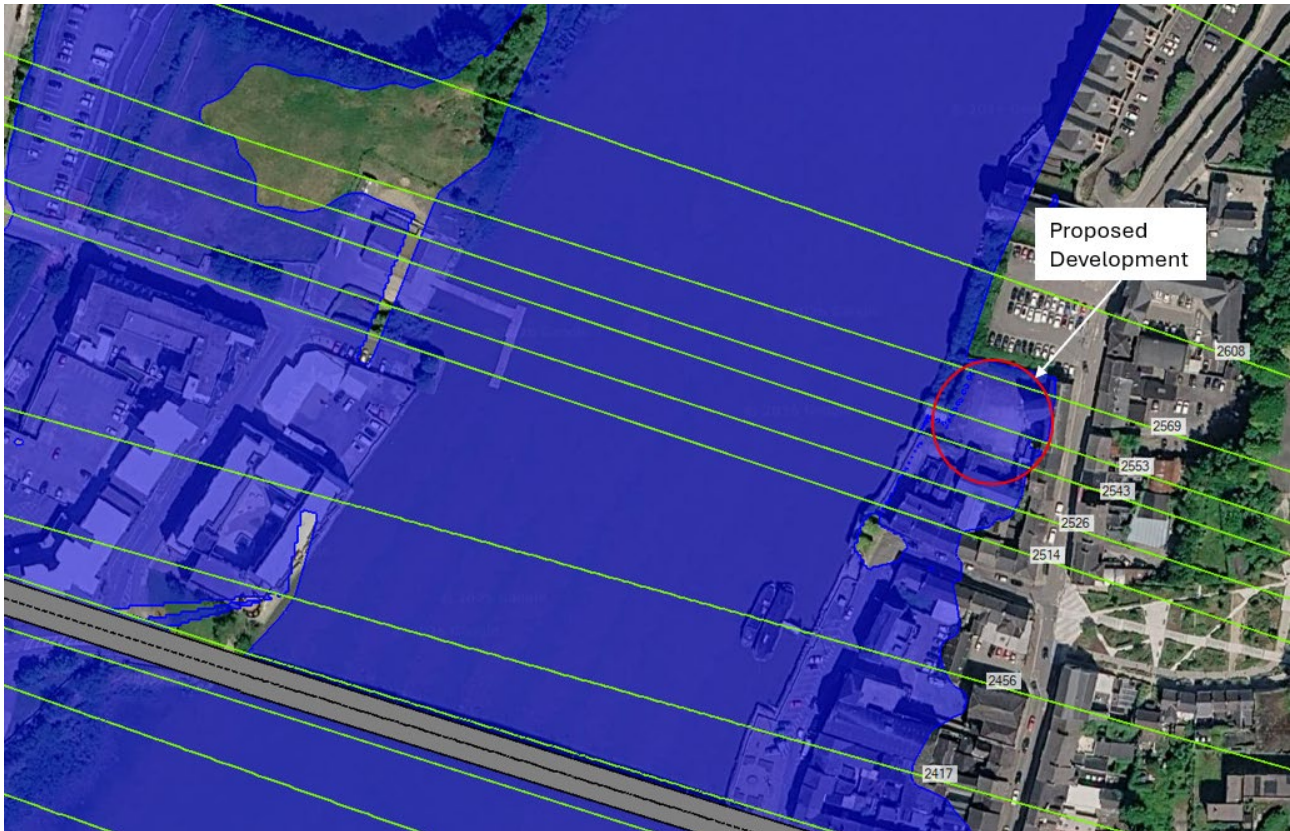


Figure 8-3: Flood Zone B

8.2.2 Scenario2- Fluvial Dominant Event

Flood Zone A

A hydraulic model was developed for the 1% AEP fluvial event, incorporating tidal influences through the application of downstream boundary water levels associated with a higher-probability and therefore less severe coastal event, together with the effects of climate change. Table 8-8 below presents the predicted water levels, flow rates, and velocities across the proposed development site.

Table 8-8: Water Levels-Proposed Development (1% AEP Fluvial)

Cross Section	Water Surface Elevation (m OD)	Flow (m ³ /s)	Velocity (m/s)
2569	3.13	1346.4	0.88
2553	3.13	1346.4	0.88
2543	3.13	1346.4	0.88
2526	3.12	1346.4	0.88
2514	3.12	1346.4	0.89

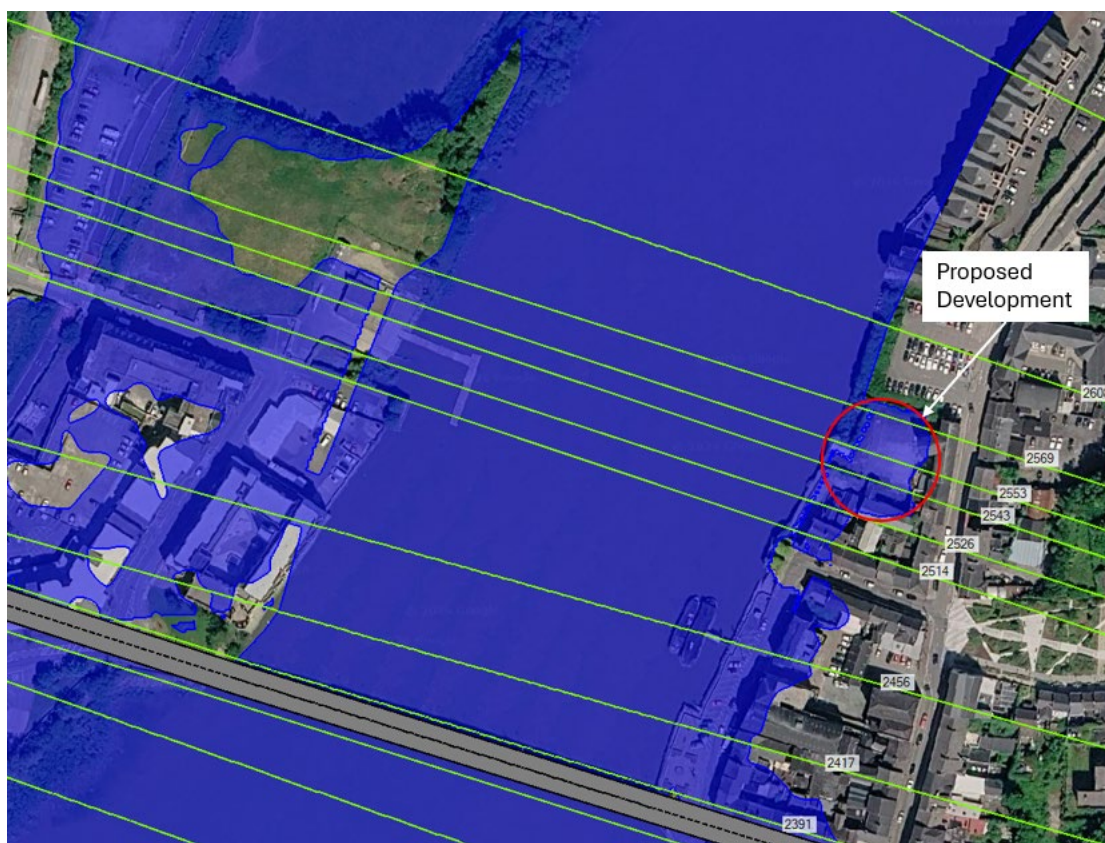


Figure 8-4: Flood Zone A

Flood Zone B

A hydraulic model was also developed for the 0.1% AEP fluvial event, incorporating tidal influences through the application of downstream boundary water levels, together with the effects of climate change. Table 8-9 below presents the water levels, flow rates, and velocities predicted across the proposed development site.

Table 8-9: Water Levels-Proposed Development (0.1% AEP Fluvial)

Cross Section	Water Surface Elevation (m OD)	Flow (m ³ /s)	Velocity (m/s)
2569	3.21	1743.7	1.12
2553	3.21	1743.7	1.12
2543	3.21	1743.7	1.13
2526	3.21	1743.7	1.13
2514	3.20	1743.7	1.13

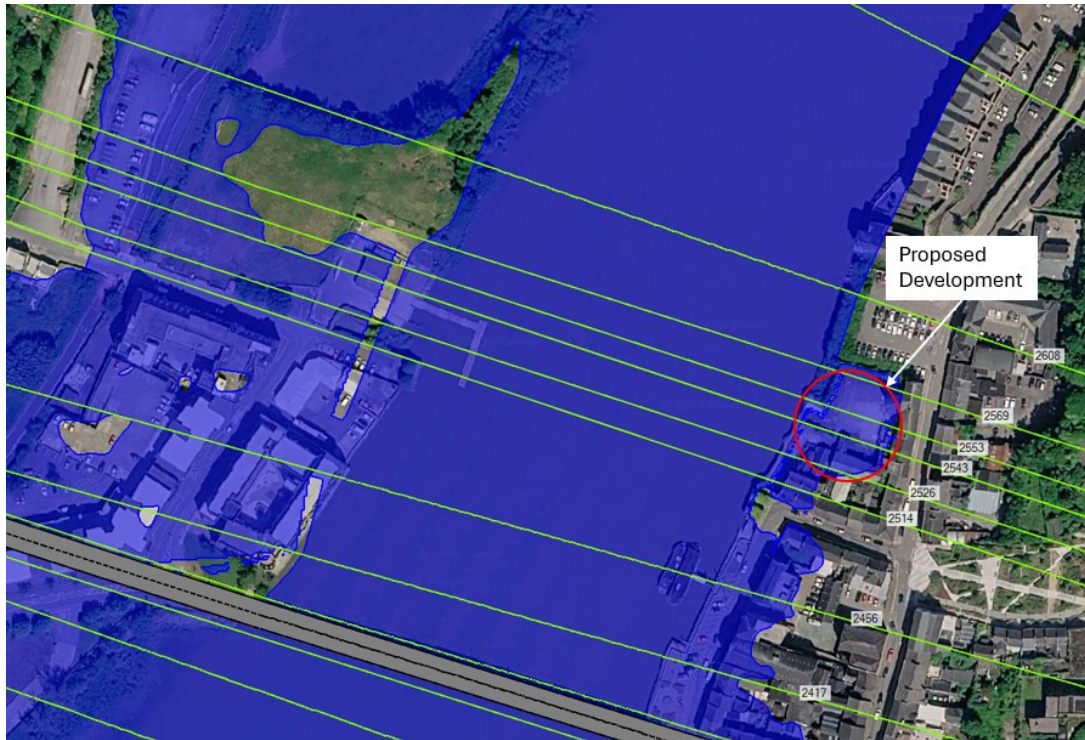


Figure 8-5: Flood Zone B

8.2.3 Comparison between Scenario 1 and Scenario 2

Flood Zone A

Figure 8-6 below compares the water level profiles for Scenario 1 and Scenario 2 for the events considered for Flood Zone A.

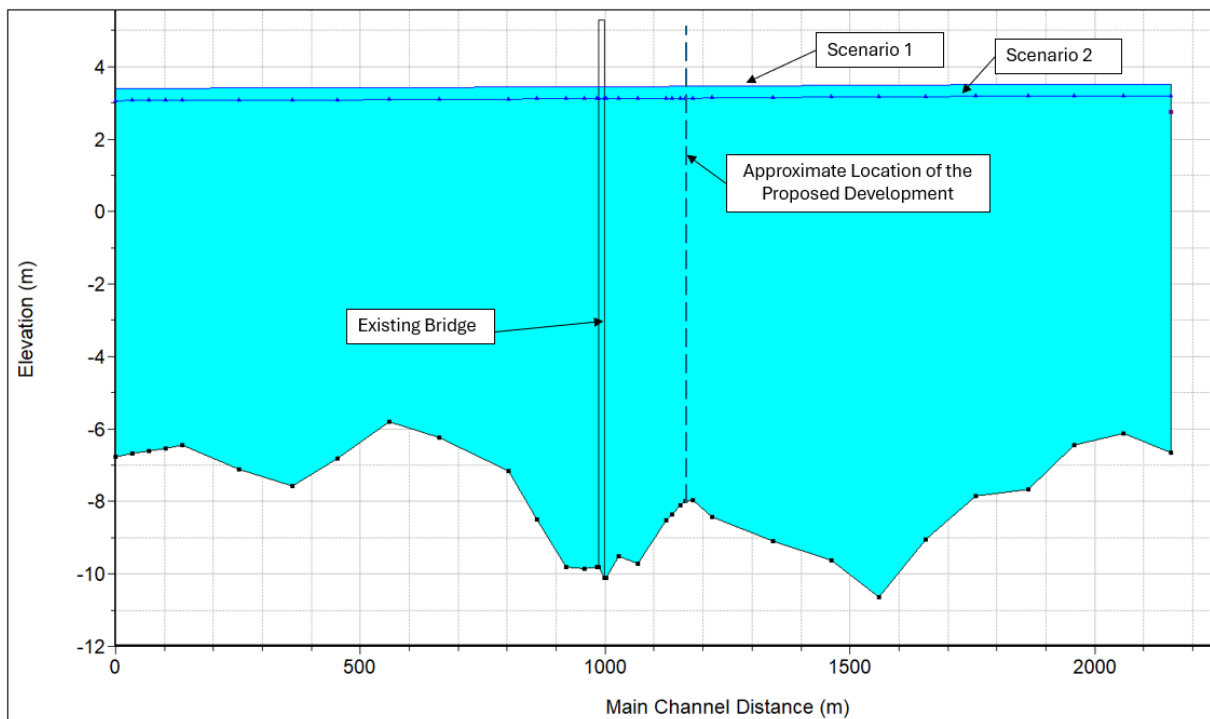


Figure 8-6: Water Level Profiles-Scenario 1 & Scenario 2-Flood Zone A



At the location of the proposed development, there is an approximate water level difference between Scenario 1 and Scenario 2 of 330 mm when considering the highest probability of flooding from the river and the sea (Flood Zone A).

Flood Zone B

Figure 8-7 below compares the water level profiles for Scenario 1 and Scenario 2 for the events considered for Flood Zone B

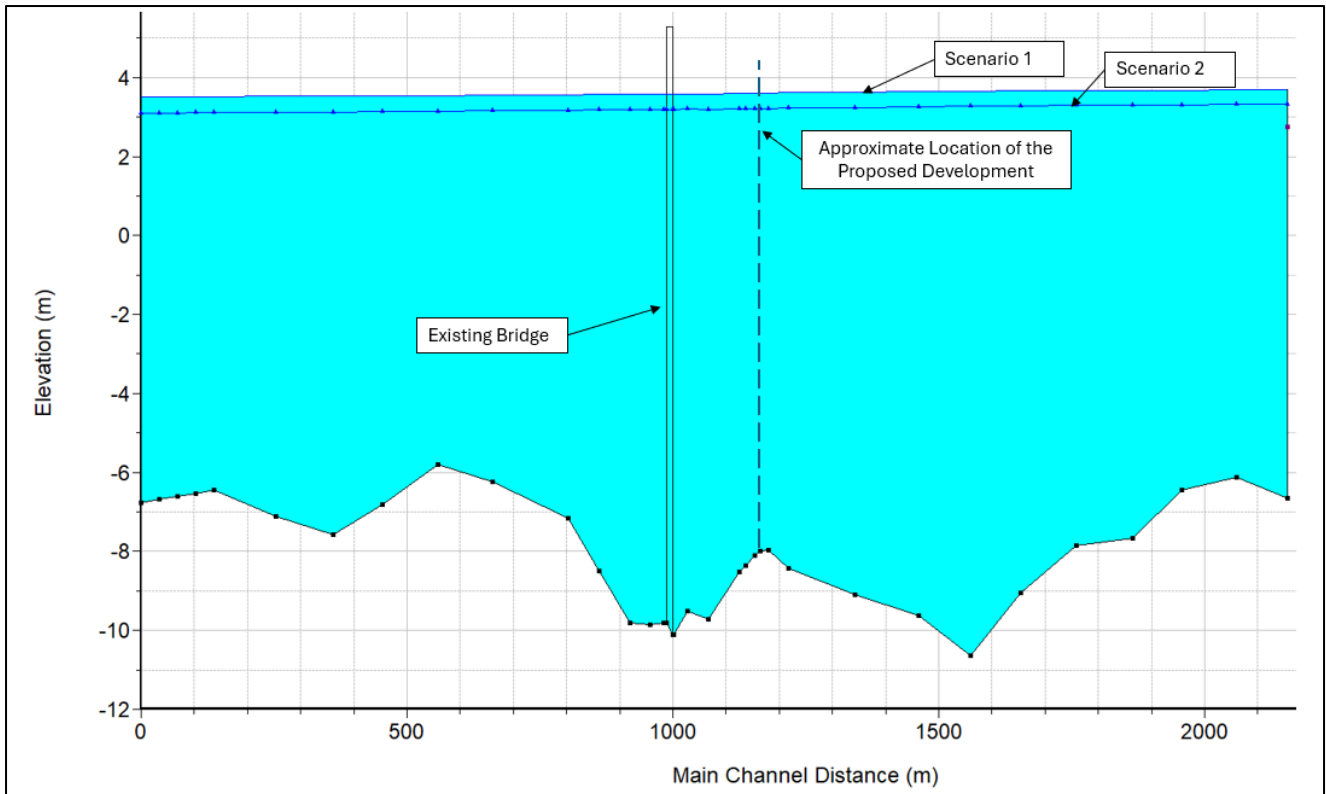


Figure 8-7: Water Level Profiles-Scenario 1 & Scenario 2-Flood Zone B

At the location of the proposed development, there is an approximate water level difference between Scenario 1 and Scenario 2 of 390 mm when considering a moderate probability of flooding from the river and the sea (Flood Zone B).



9. MITIGATION MEASURES AND RECOMMENDATIONS

The proposed development comprises a public realm project for the construction of footpaths and shared surfaces which includes improvements to Public Realm to Bridge Street and lands to the rear and side of The Grain Store, John's Street, New Ross, Wexford.

Based on the hydrological and hydraulic assessments undertaken to determine flood levels for the various flood scenarios and events, it is recommended that, should the existing levels of the masonry wall, which currently acts as an informal flood defence and forms the boundary of the courtyard, be lowered, its crest level should be maintained at no less than the Scenario 1 flood level for the 0.1% AEP event, plus 300 mm freeboard. This corresponds to a minimum crest level of 3.90 m OD (comprising a flood level of 3.60 m OD plus 300 mm freeboard).

In addition, given the current condition of the existing masonry wall, it is recommended that a structural assessment be undertaken to determine its suitability to withstand the design flood levels. If the assessment conclude that the wall is structurally inadequate, consideration should be given to its replacement with a purpose-designed flood defence wall capable of providing the required standard of flood protection.

Although the proposed plaza constitutes water-compatible development and is considered appropriate within Flood Zone A, the site relies on existing flood defences for protection. Residual flood risks associated with overtopping, breach, or exceedance events therefore remain. Accordingly, it is recommended that a Flood Emergency Response Plan be prepared and implemented to ensure the safety of visitors during extreme flood events.

Particular consideration should be given to the fact that the plaza is located below the surrounding ground level, with access and egress reliant on stairways leading to street level. As a result, sufficient advance warning and timely evacuation procedures will be required to ensure that all visitors can safely exit the site before flood conditions restrict access or pose a risk to life and safety.



10. CONCLUSIONS

This Site-Specific Flood Risk Assessment (SSFRA) has examined the hydrological and hydraulic conditions associated with the proposed development in New Ross. The assessment confirms that the site is susceptible to both coastal and fluvial flooding and is located within Flood Zones A and B. However, it is considered that the primary source of flood risk is coastal flooding, as the river is strongly tidally influenced. Two hydraulic scenarios were assessed. Scenario 1 represents a highly conservative and less likely scenario in which extreme fluvial and coastal flood events occur simultaneously. Scenario 2 assumes that fluvial flooding is the dominant source of flooding.

To determine the minimum required crest level of the wall where its height is proposed to be reduced, the flood level derived from Scenario 1 for the 0.1% AEP event, together with a 300 mm freeboard allowance, was adopted. This resulted in a minimum wall crest level of 3.90 m OD.

The proposed development is located within Flood Zones A and B; however, as it comprises a public plaza and open space, it is classified as water-compatible development.

Although the site benefits from existing informal and formal flood protection measures, residual flood risks remain. Accordingly, recommendations have been provided regarding the preparation and implementation of a Flood Emergency Response Plan to address more extreme flood events and the potential failure or overtopping of the flood defence wall. In addition, recommendations have been made in relation to the existing masonry wall, which should be subject to a structural assessment if its height is reduced to the proposed crest level.

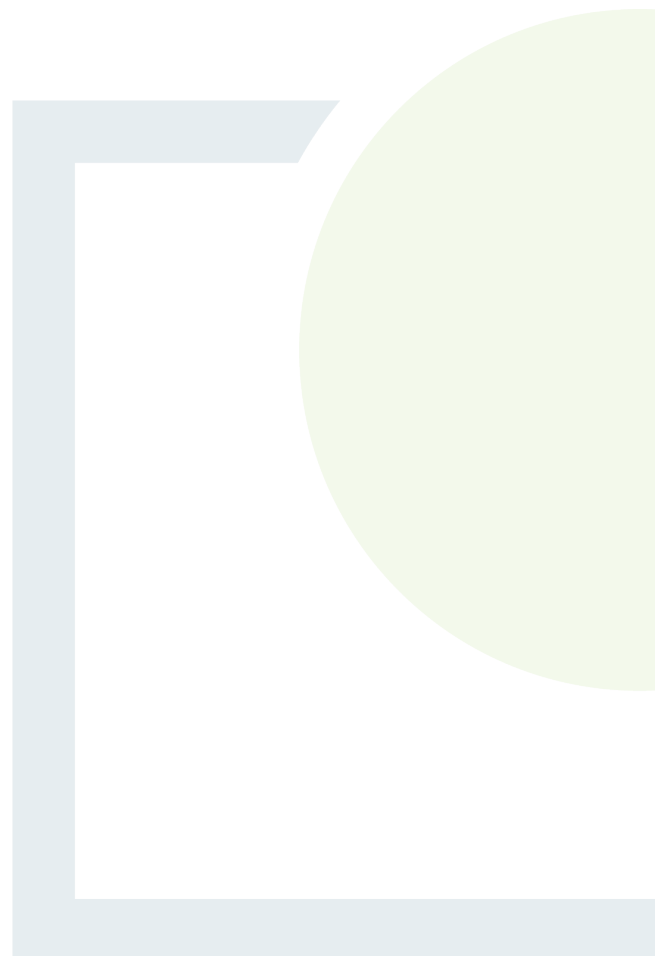
This Flood Risk Assessment has been undertaken in accordance with The Planning System and Flood Risk Management Guidelines and is consistent with the core principles and recommendations contained within the Guidelines.



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APPENDIX 1

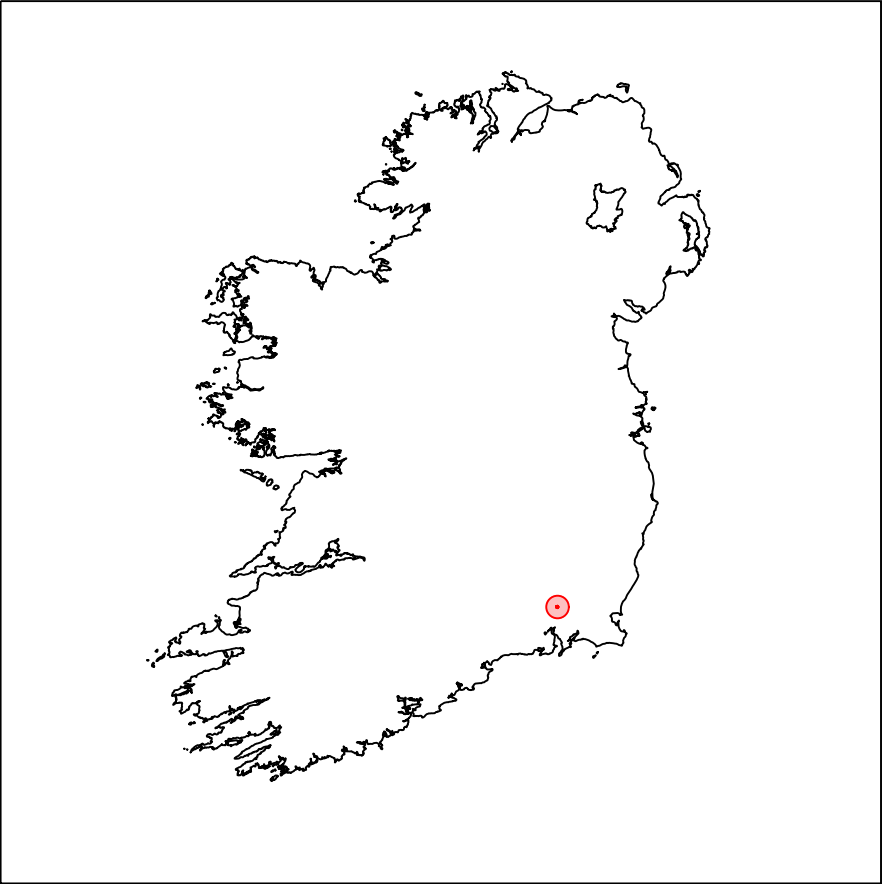
SITE LOCATION





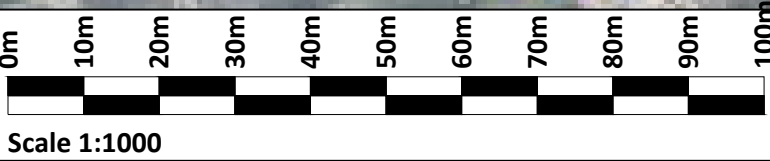
LEGEND:

Site Boundary



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PLAN
Scale 1:1000





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Rev.	Description	App By	Date
P01	ISSUE FOR FURTHER INFORMATION	GF	30.09.26

PROJECT		CLIENT		
IMPROVEMENTS TO PUBLIC REALM , JOHN STREET NEWROSS CO. WEXFORD		 Comhairle Chontae Loch Garman Wexford County Council		
SHEET		Date	Project number	Scale (@ A1-)
SITE LOCATION MAP		30.09.26	P26-195	1:1000
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		CS	P26195-FT-EWE-XX-DR-CE-0001	P01
		Checked by		
		PD		

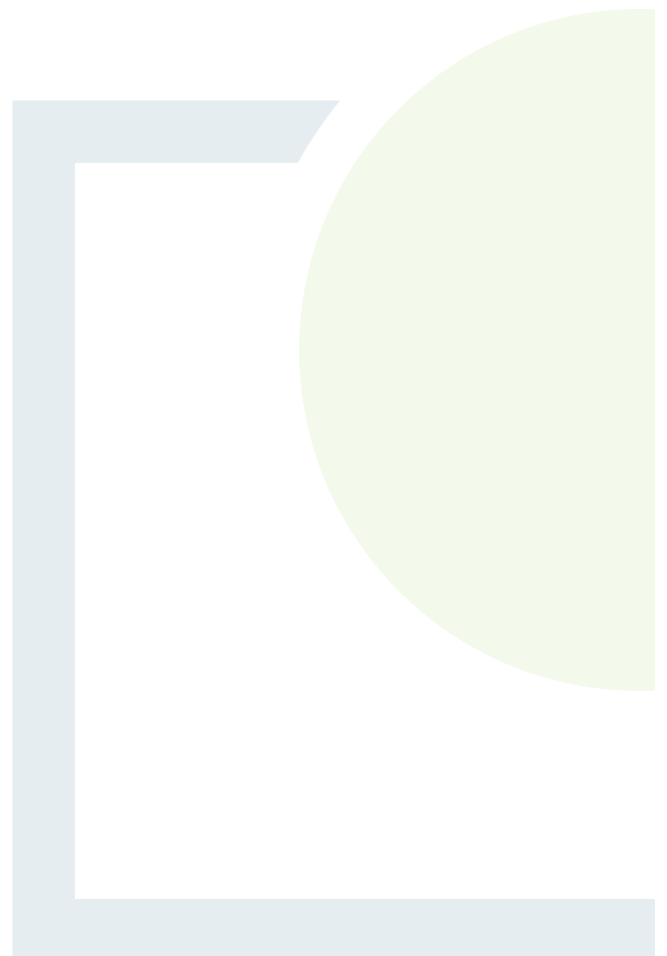
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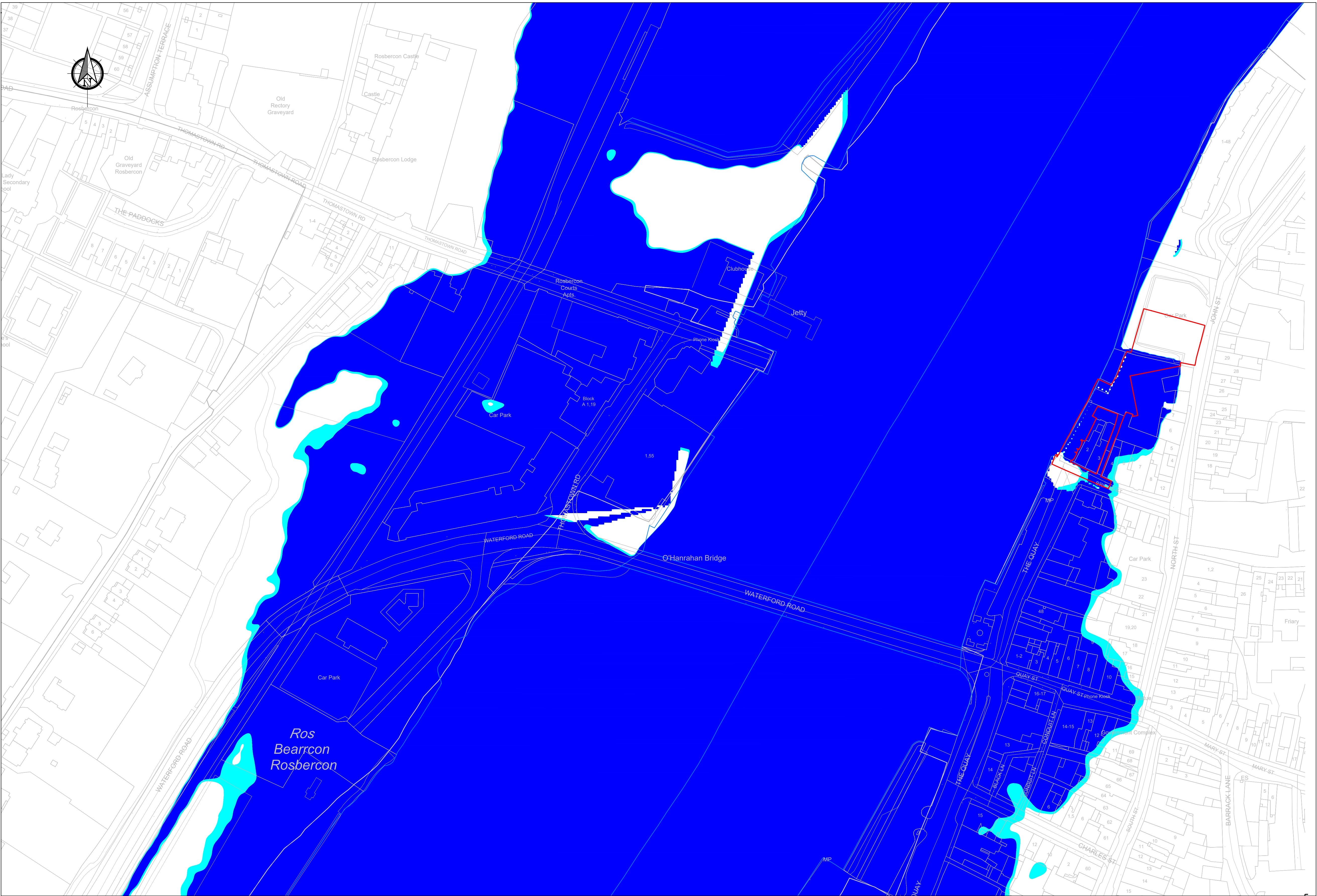


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APPENDIX 2

SSFRA FLOOD MAPS

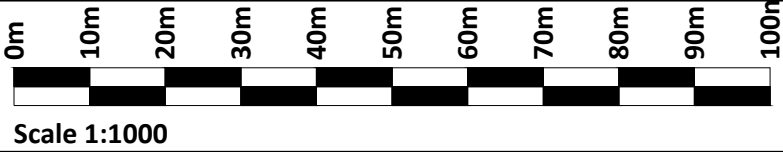




LEGEND:

- Site Boundary
- Flood Zone A
Mid Range Future Scenario
- Flood Zone B
Mid Range Future Scenario

PLAN
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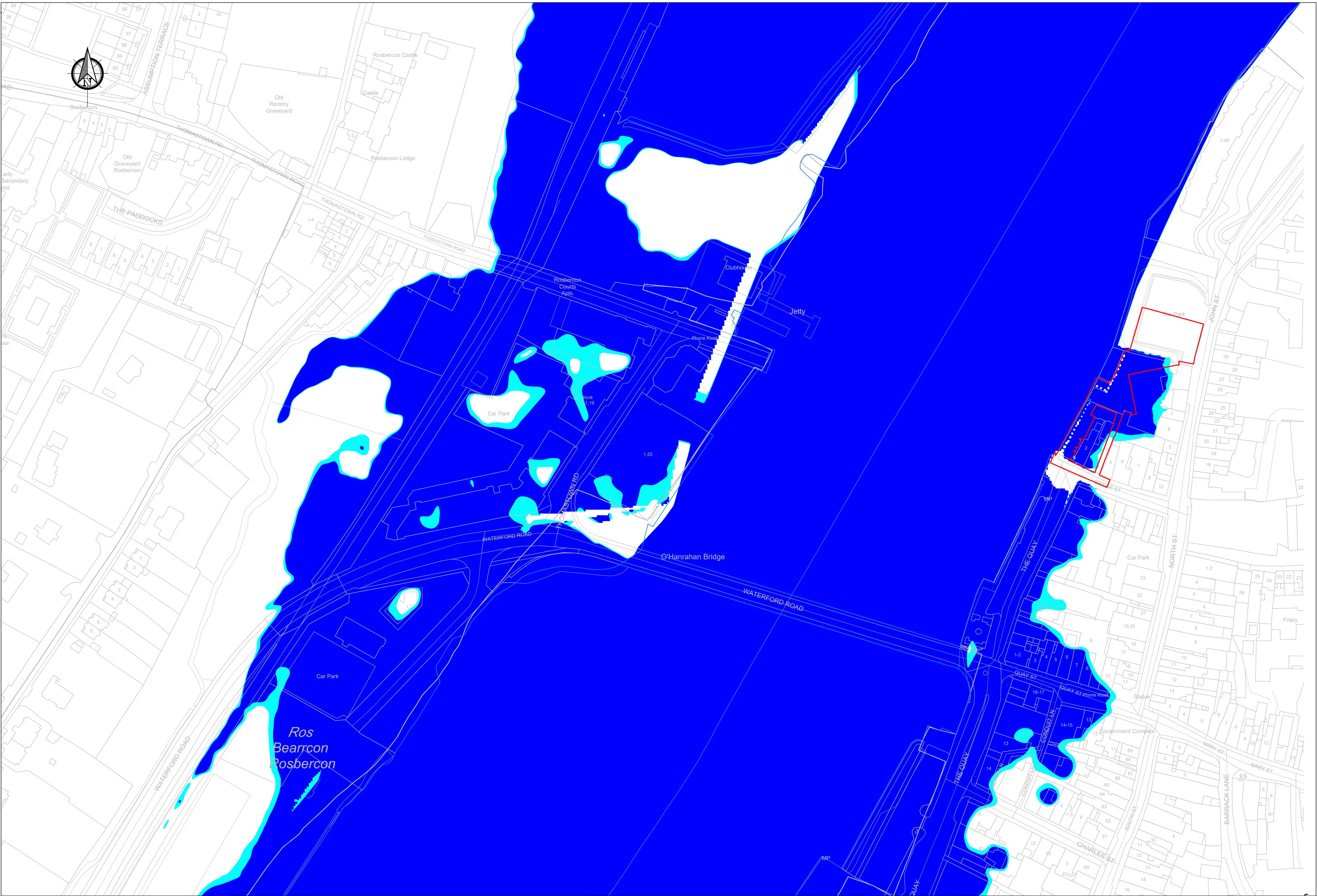
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P01	ISSUE FOR FURTHER INFORMATION	GF	30.09.26

PROJECT	IMPROVEMENTS TO PUBLIC REALM , JOHN STREET NEWROSS CO. WEXFORD		CLIENT						
	COASTAL AND FLUVIAL FLOOD ZONES A & B								
Comhairle Chontae Loch Garman Wexford County Council									
SHEET	COASTAL AND FLUVIAL FLOOD ZONES A & B		Date	30.09.26	Project number	P26-195	Scale (@ A1-)	1:1000	
			Drawn by	CS	Drawing Number			P26195-FT-EWE-XX-DR-CE-0002	Rev
			Checked by	PD	(Sheet not subject D100)				
									P01

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1 October 2026 O:\ACAD\2026\P26-195\P26195-FT-EWE-XX-DR-CE-0002



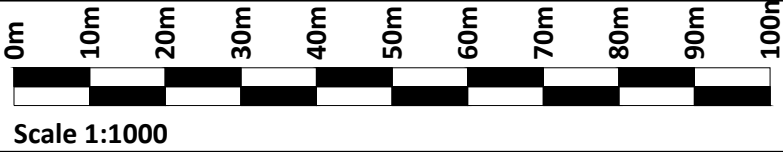
LEGEND:

Site Boundary

Flood Zone A
Mid Range Future Scenario

Flood Zone B
Mid Range Future Scenario

PLAN
Scale 1:1000



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P01	ISSUE FOR FURTHER INFORMATION	GF	30.09.26

PROJECT	IMPROVEMENTS TO PUBLIC REALM , JOHN STREET NEWROSS CO. WEXFORD			CLIENT	 Comhairle Chontae Loch Garman Wexford County Council						
	SHEET	FLUVIAL FLOOD ZONES A & B			Date	30.09.26	Project number	P26-195	Scale (@ A1-)	1:1000	
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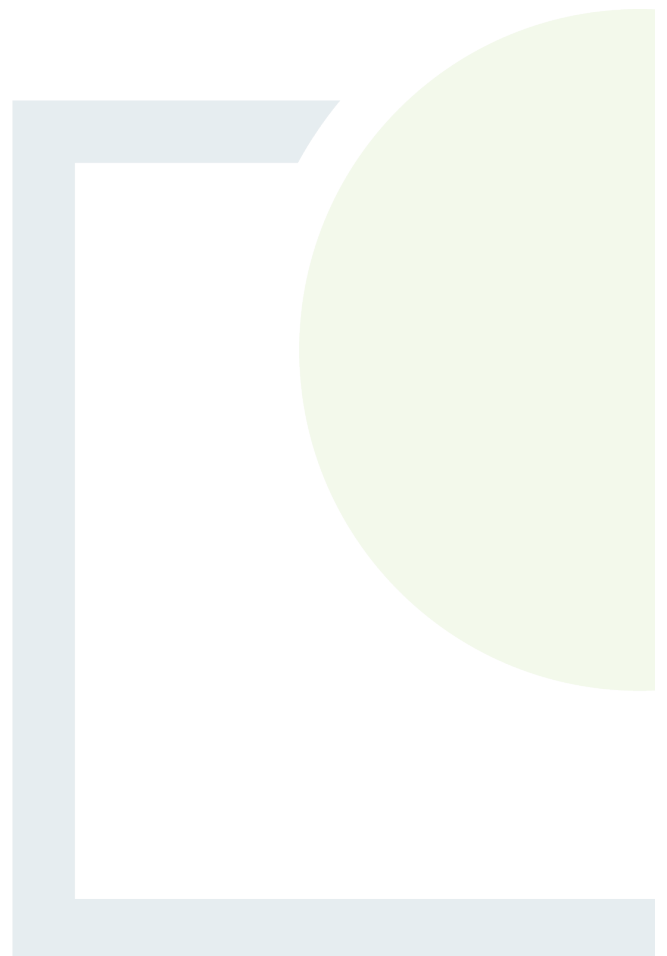
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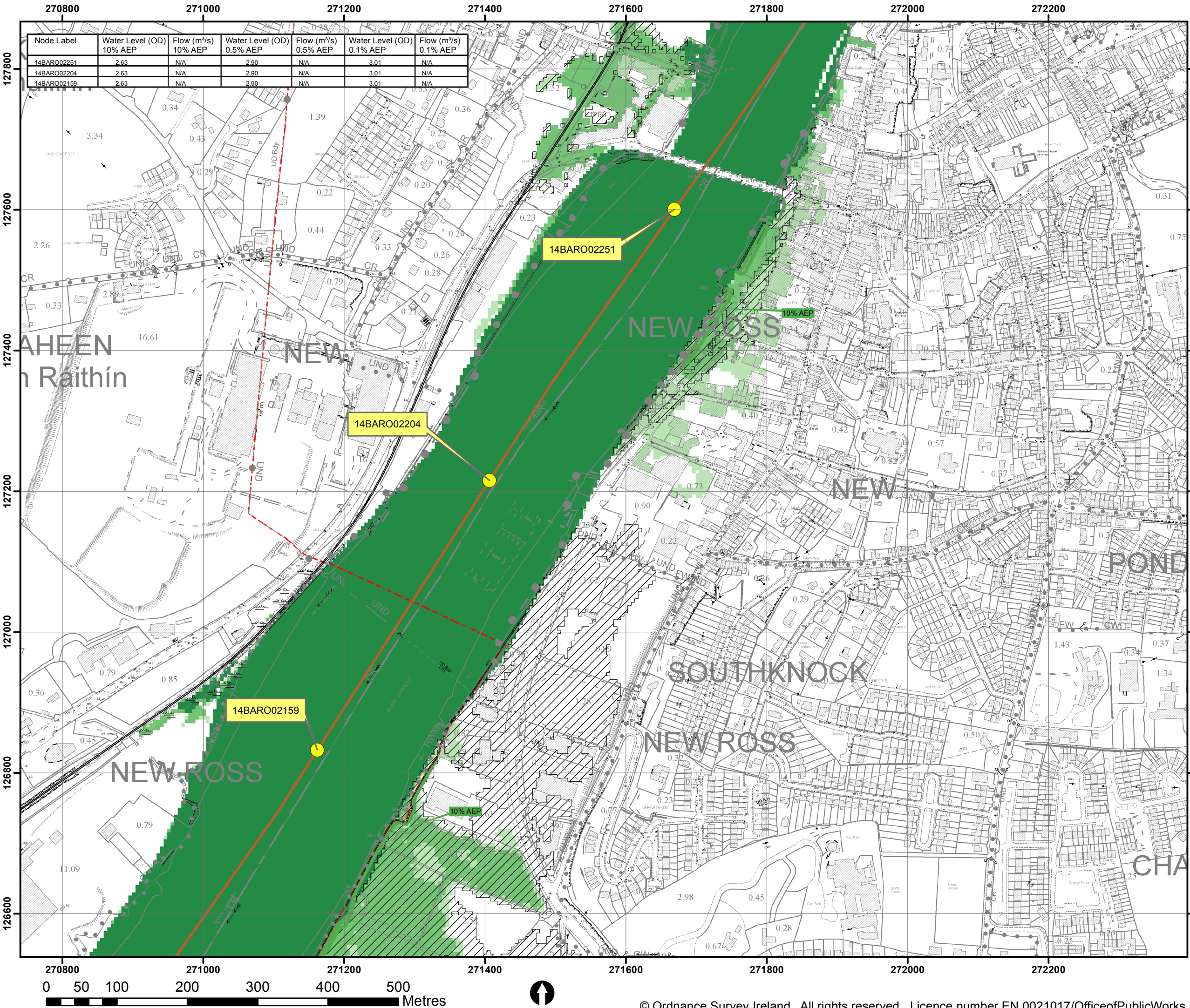


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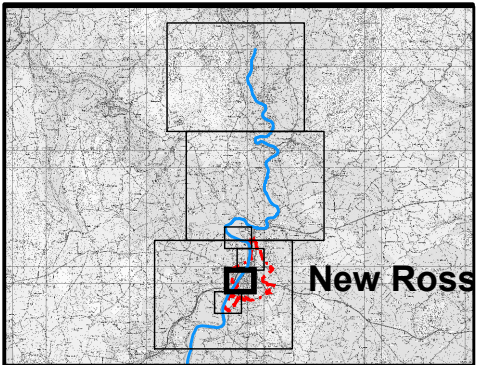
APPENDIX 3

CFRAM MAPS





Node Label	Water Level (OD) 10% AEP	Flow (m³/s) 10% AEP	Water Level (OD) 0.5% AEP	Flow (m³/s) 0.5% AEP	Water Level (OD) 0.1% AEP	Flow (m³/s) 0.1% AEP
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14BARO02204	2.63	N/A	2.90	N/A	3.01	N/A
14BARO02159	2.63	N/A	2.90	N/A	3.01	N/A



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

FINAL

REV:	NOTE:	DATE:
01	Addition of SOP to Flood Defences.	05/01/17





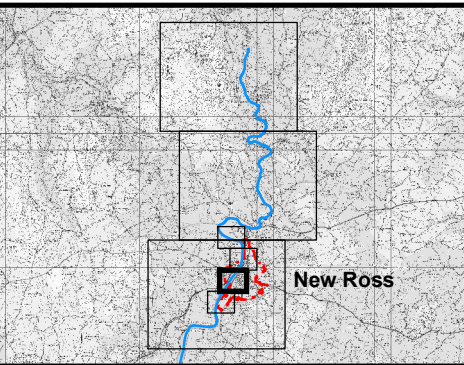
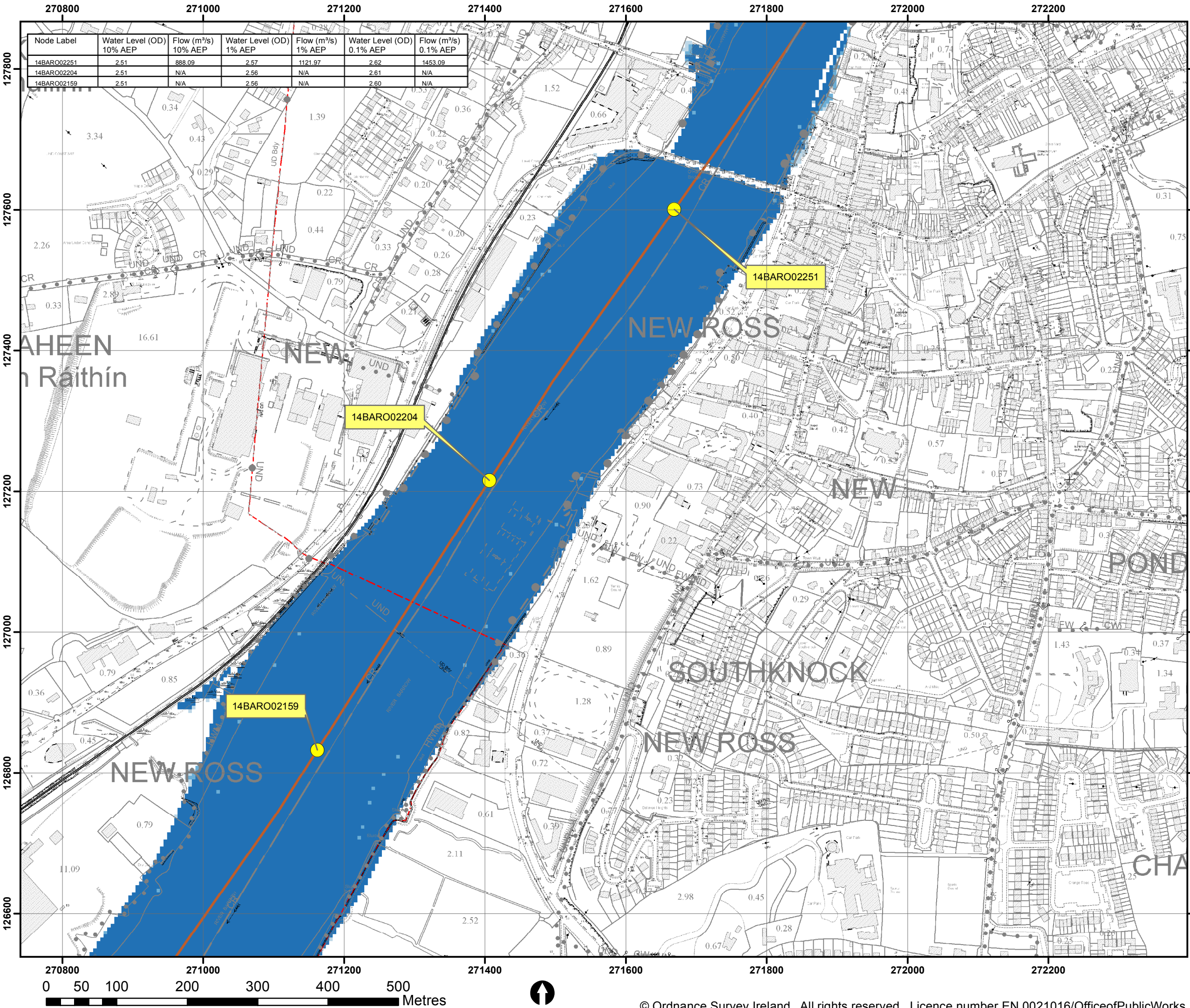
The Office of Public Works
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W www.rpsgroup.com
E ireland@rpsgroup.com

Map:
New Ross Tidal Flood Extents
Map Type: EXTENT
Source: TIDAL
Map Area: COASTAL
Scenario: CURRENT
Drawn By : F.M.C. Date : 5 January 2017
Checked By : E.H. Date : 5 January 2017
Approved By : S.P. Date : 5 January 2017
Drawing No. : O14NRO_EXCCD_F0_03
Map Series : Page 3 of 7
Drawing Scale : 1:5,000 @A3



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Legend

- 10% Fluvial AEP Event
- 1% Fluvial AEP Event
- 0.1% Fluvial AEP Event
- Modelled River Centreline
- AFA Extents
- Node Point
- Node ID Node Label

FINAL

REV:	NOTE:	DATE:
------	-------	-------



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Map:	
New Ross Fluvial Flood Extents	
Map Type:	EXTENT
Source:	FLUVIAL
Map Area:	HPW
Scenario:	CURRENT
Drawn By :	F.M.C. Date : 20 July 2016
Checked By :	E.H. Date : 20 July 2016
Approved By :	S.P. Date : 20 July 2016
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Page 3 of 7	
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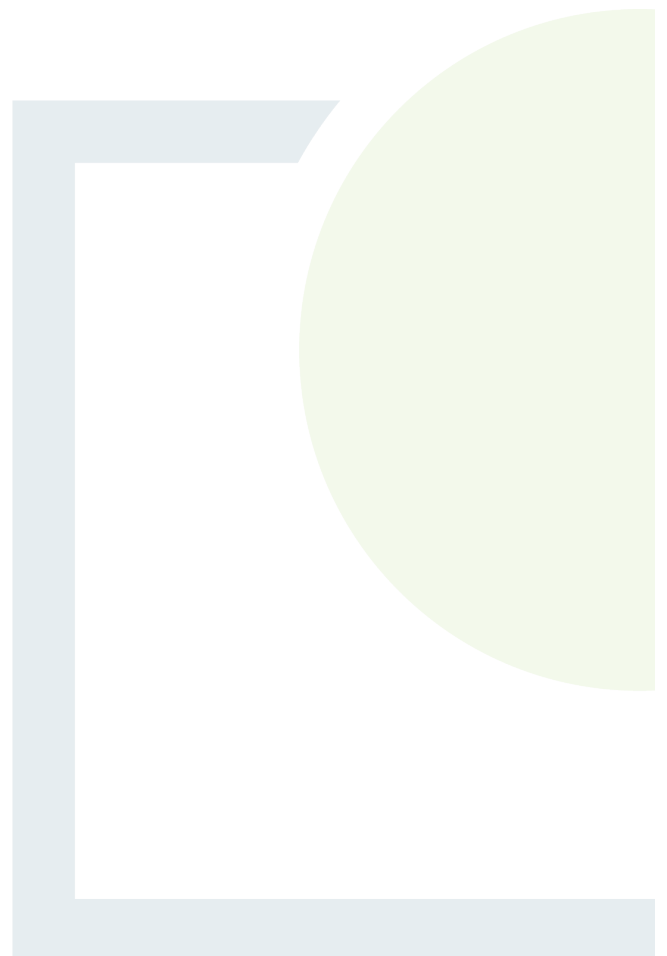




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APPENDIX 4

SITE PHOTOS





Existing Boundary Wall



Existing Flood Defence



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