

# Navan Cycle Scheme – R147 Poolboy Bridge to Kells Road Roundabout

Flood Risk Assessment

Meath County Council

October 2022



# Notice

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This document has 13 pages including the cover.

## Document history

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## Client signoff

Client	Meath County Council
Project	Navan Cycle Scheme – R147 Poolboy Bridge to Kells Road Roundabout
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# 1. Introduction

Atkins were commissioned by Meath County Council to prepare a Flood Risk Assessment (FRA) as part of providing Engineering-led Multi-disciplinary Consultancy and Design services for the concept and preliminary design of cycle provisions and associated works on the R147 from Poolboy Bridge to Kells Road Roundabout in Navan, Co. Meath.

## 1.1. Relevant Guidance

This FRA has been undertaken in consideration with 'The Planning System and Flood Risk Management – Guidelines for Planning Authorities' DOEHLG November 2009, which is the latest guidance document.

The guidance has been issued to ensure that flood risk is a key consideration for developers, planning & regional authorities, and the public in preparing and submitting development proposals. The principles of the guidance are as follows:

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

A staged approach is recommended within the guidance document in relation to identifying and assessing flood risk. The three stages of appraisal and assessment are as follows:

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

## 1.2. Flood Risk

Flood risk can be quantified by relating the probability of the flood event occurring to the consequence of the flood. Probability, in flood event terms, is gauged by potential annual occurrence/return period and flood consequence is dependent on the nature of the flood hazard and the vulnerability of the inundated area. The source-pathway-receptor model considers the components of flood risk.



The source is the hazard with the potential to cause harm through flooding (e.g., rainfall, high sea levels). The pathway is the mechanism by which the source can affect the receptor (e.g., inadequate drainage, overtopping of coastal defences) and finally, the receptor is anything which is affected by the flood event (e.g., people, infrastructure, property).

## 1.3. Causes of Flooding

The Planning System and Flood Risk Management Guidelines requires an FRA to consider all potential causes of flooding including the following:

- Coastal flooding
- Inland flooding
  - Overland flow
  - River flooding
  - Flooding from artificial drainage systems
  - Groundwater flooding
  - Estuarial flooding
- Failure of infrastructure

## 1.4. Floodplains

A river flood plain is a low-lying area which receives excess flood water when the flow within the watercourse exceeds the capacity of the channel. A coastal flood plain is an area which, during high tide or increased sea levels, becomes inundated with sea water.

## 1.5. Assessing Flood Risk

In the context of the 'Planning System and Flood Risk Management Guidelines, DOEHLG, 2009' three flood zones are designated in the consideration of flood risk to a particular site. The three flood zones are described in Table 1-1 below.

**Table 1-1 - Flood Zone Description**

<b>Flood Zone</b>	<b>Description</b>
Flood 'Zone A'	where the probability of flooding is the highest (greater than 1% or 1 in 100 year for watercourse flooding or 0.5% or 1 in 200 for coastal flooding).
Flood 'Zone B'	where the probability of flooding is moderate (between 0.1% or 1 in 1000 year and 1% or 1 in 100 year for watercourse flooding, and between 0.1% or 1 in 1000 year and 0.5% or 1 in 200 for coastal flooding).
Flood 'Zone C'	where the probability of flooding is low or negligible (less than 0.1% or 1 in 1000 year for both watercourse and coastal flooding).  Flood Zone 'C' covers all areas which are not in Zones 'A' or 'B'.

The planning implications for each of the flood zones are:

**Zone A - High probability of flooding.** Most types of development would be considered inappropriate in this zone. Development in this zone should be avoided and/or only 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 Justification Test has been applied. Only water-compatible development, such as docks and marinas, dockside activities that require a waterside location, amenity open space, outdoor sports, and recreation, would be considered appropriate in this zone.

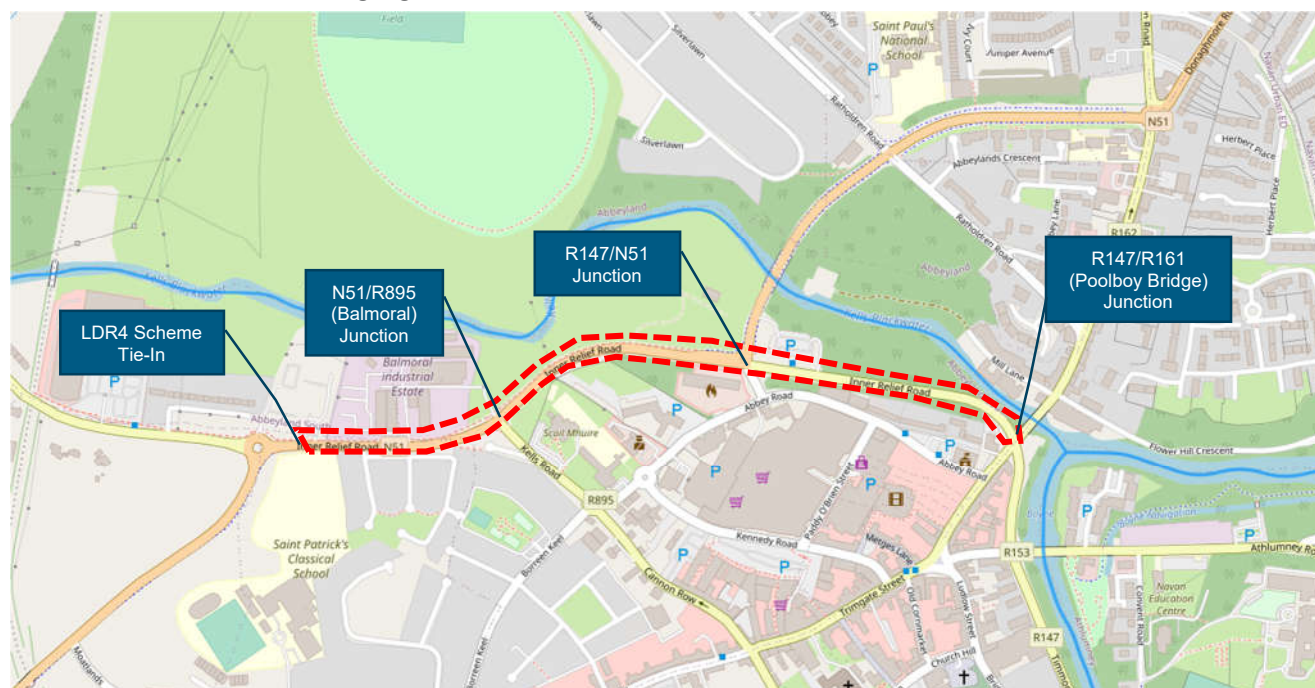
**Zone B - Moderate probability of flooding.** Highly vulnerable development, such as hospitals, residential care homes, Garda, fire, and ambulance stations, dwelling houses and primary strategic transport and utilities infrastructure, would generally be considered inappropriate in this zone, unless the requirements of the Justification Test can be met. Less vulnerable development, such as retail, commercial and industrial uses, sites used for short-let for caravans and camping and secondary strategic transport and utilities infrastructure, and water-compatible development might be considered appropriate in this zone. In general, however, a 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 and from the development can or will adequately be managed.

**Zone C - Low probability of flooding.** Development in this zone is appropriate from a flood risk perspective (subject to assessment of flood hazard from sources other than rivers and the coast) but would need to meet the normal range of other proper planning and sustainable development considerations.

## 2. Site Description

### 2.1. Site Location

The Project is located north of Navan Town centre, adjacent to the River Blackwater (which is part of the “River Boyne and River Blackwater” SAC). The western end of the scheme ties into the proposed LDR4 Scheme 1 while the eastern end ties into the R147/Flower Hill (Poolboy Bridge). Figure 2-1 illustrates the location and the extents of the active travel scheme highlighted in red.



**Figure 2-1 - Site Location**

### 2.2. Existing Site Conditions

The proposed active travel scheme will run along the existing R147 and N51 Inner Relief Road. The River Blackwater runs north of the proposed route. The site is comprised of predominantly hardstanding areas made up of roads and footpaths. There is also existing open space north of the proposed route corridor, mainly comprised of trees and grass adjacent to the Blackwater riverbank.

### 2.3. Topography

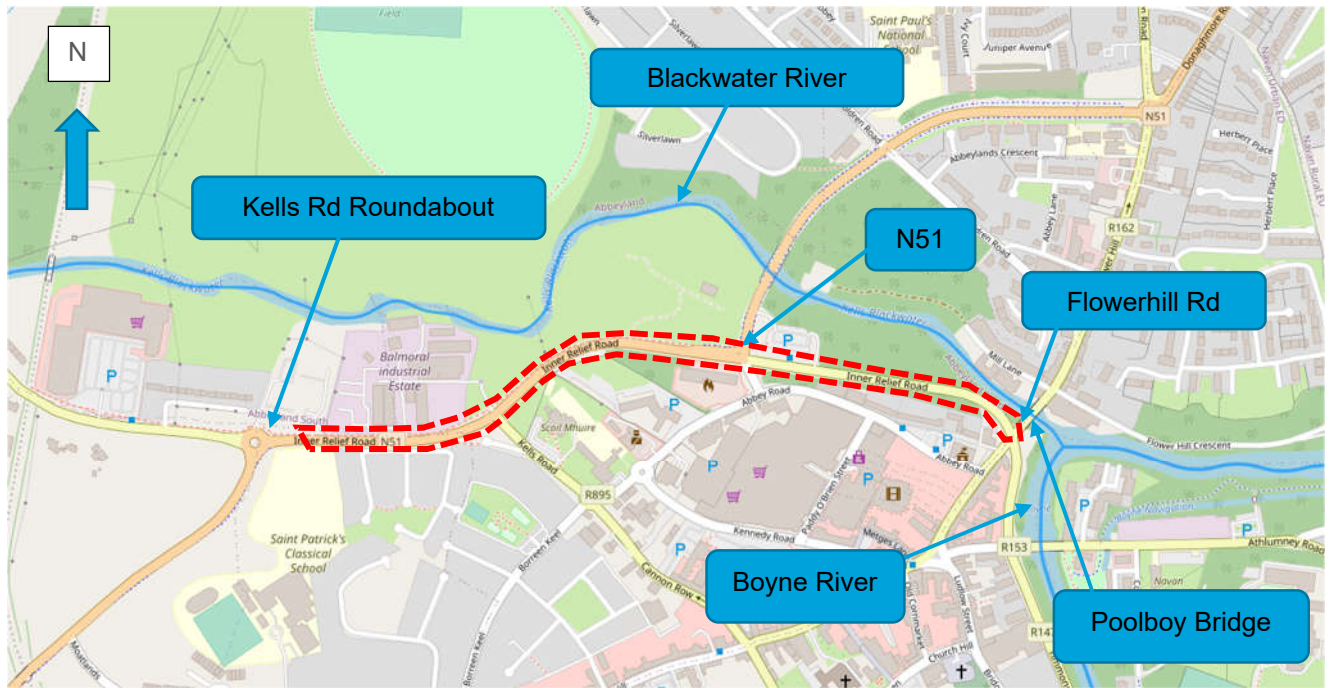
The proposed site for the active travel scheme falls from the Kells Road Roundabout eastbound towards the R147/Flowerhill (Poolboy Bridge) intersection with levels falling from 44m AOD to 33m AOD. The site is consistent with the longitudinal gradient of the existing road.

### 2.4. Local Hydrology & Existing Drainage

The site is located within the Water Framework Directive (WFD) Catchment 07 /Boyne Catchment. The Blackwater River (IE\_EA\_07B011800) flows parallel to the site in an easterly direction to the Boyne River south. The Blackwater River is bridged at the Poolboy Bridge and the proposed cycle route starts north of the R147 Road / Flowerhill Rd intersection.

Figure 2-2 below displays the local hydrology and water features adjacent to the proposed site, the base map has been extracted from the Envision website which is the EPA's interactive map viewer.

<sup>1</sup> Local Distributor Road 4



**Figure 2-2 - Local Hydrology (EPA Envision)**



## 3. Flood Risk Identification

### 3.1. Flood Risk Investigation

In accordance with the document “The Planning System and Flood Risk Management Guidelines for Planning Authorities” a Stage 1 Flood Risk Identification is required to be undertaken to identify if there are any flooding or surface water management issues related to the proposed development that may warrant further investigation. Initially, the following possible flood mechanisms for the proposed Navan Cycle Scheme: R147 Poolboy Bridge to Kells Road Roundabout have been identified:

**Table 3-1 - Possible Flooding Mechanisms**

Source/Pathway	Significant?	Comment/Reason
Coastal flooding	No	The proposed site is not located in a coastal area.
Overland flow	No	The site is located within an existing hardstanding area which is drained by a conventional surface water network. The hardstanding areas are served by conventional drainage systems, operated, and maintained by the Meath County Council, the risk of overland flow flooding to the site is deemed to be low.
River flooding	Yes	The Blackwater River is adjacent to the proposed site. The risk of flooding adjacent to the Poolboy bridge.
Flooding from artificial drainage systems	No	The existing artificial drainage systems within the site are operated and maintained by the Meath County Council. Therefore, the risk of flooding from the existing artificial drainage system is also not deemed significant.
Groundwater flooding	No	According to the OPW floodmaps ( <a href="http://www.floodinfo.ie">floodinfo.ie</a> ) there are no significant springs or groundwater discharges recorded in the immediate vicinity of the site
Estuarial flooding	No	The proposed development is not located in an estuarial area.
Failure of infrastructure	No	One existing bridge location adjacent to the proposed route has been identified, at the R147 Rd/Flowerhill Rd intersection (Poolboy Bridge). Since the bridge was built in 14 <sup>th</sup> century, Q100 + climate change flood flow can't be assumed in this case. It must be noted that the bridges are routinely inspected and maintained by the Meath County Council. Therefore, the risk of flooding from failure of infrastructure is not deemed to be significant.

Table 3-1 above indicates that a small section of the proposed site is at risk of fluvial flooding from the Blackwater River adjacent to the Poolboy bridge.

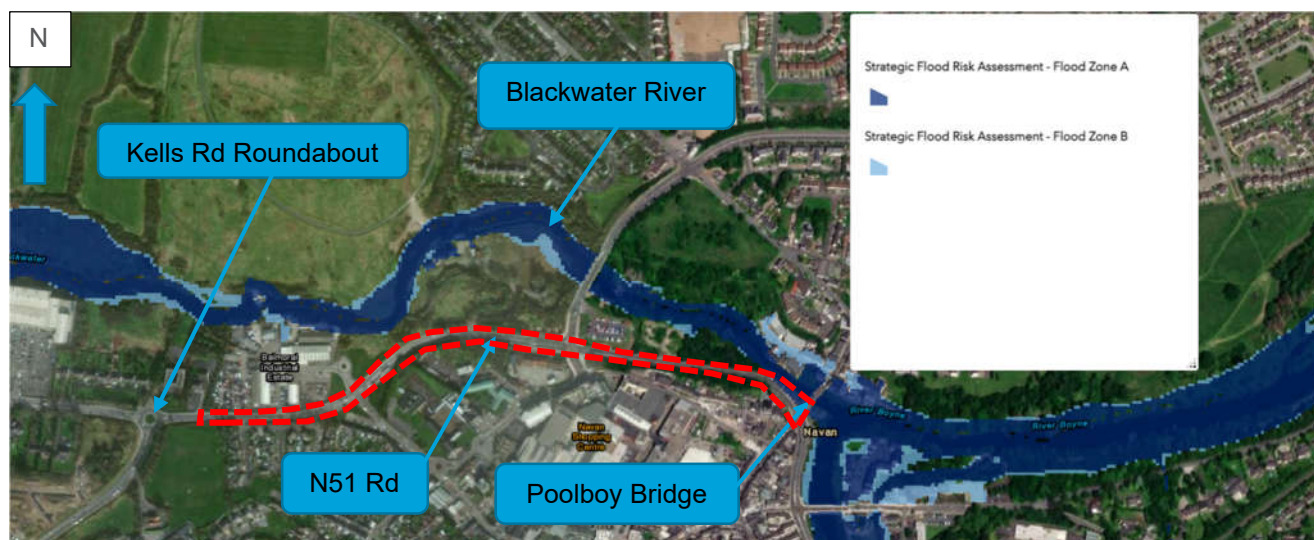
#### 3.1.1. OPW Flood Maps

The Office of Public Works (OPW) interactive map viewer (<http://www.floodinfo.ie/map/floodmaps>) was consulted in relation to the proposed site to indicate the predicted flood extents for both rivers and coastal areas over various return periods. A fluvial map specific to the site drawing No. E07NAV\_EXFCD\_F3\_10 has been included in Appendix A of this report.

#### 3.1.2. Meath County Development Plan

The Meath County Development plan was consulted to review the Strategic Flood Risk Assessment for the proposed site. The Meath County Strategic Flood Risk Assessment Map (SFRA) was consistent with findings from the OPW flood maps as it indicated that the site is located within Flood Zone A and Flood Zone B. An extract from the Meath SFRA Map is shown in figure below





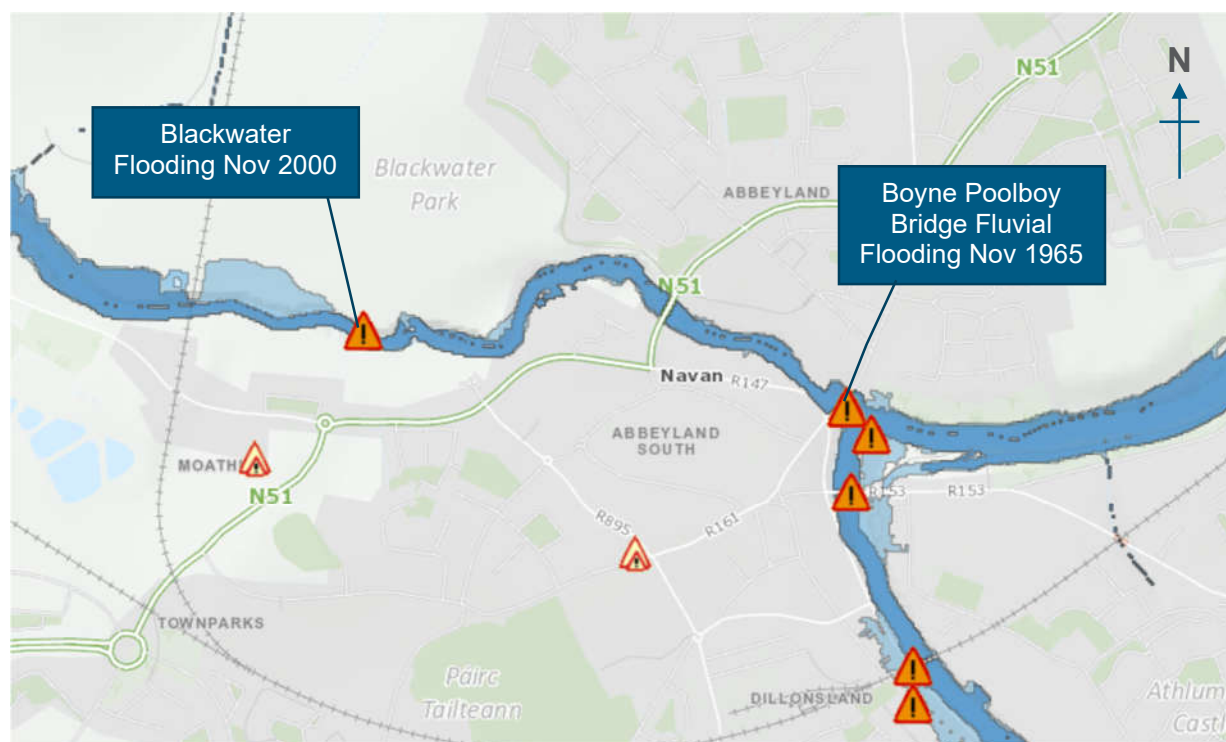
**Figure 3-1 - Meath County SFRA Map**

### 3.1.3. Ordnance Survey Historic Mapping

The GeoHive map viewer (<http://map.geohive.ie/mapviewer.html>) was consulted to review available historic mapping for the proposed scheme which can contain evidence of historical flooding incidences or occurrences. The maps consulted were the pre-1900's historic 6-inch colour and 25-inch maps. The maps did not show any evidence of historic flooding along the Blackwater River.

### 3.1.4. Historic Flood Events

The Office of Public Works (OPW) interactive map viewer <http://www.floodinfo.ie/map/floodmaps> was consulted to view any historic flood events located within the proposed site. Flood events identified fell outside the proposed route except for the flooding at Poolboy bridge from the Boyne River which occurred in November 1965. The Blackwater- River and Boyne River are highlighted as the source of historic flooding occurring in November 2000 and November 1965 respectively. Refer to extract in Figure 3-2 below.



**Figure 3-2 - Historic Flood Events**

### 3.1.5. Potential receptors

A receptor of flooding can include people, their property, and the environment. The vulnerability of a potential receptor must be identified and reviewed for all sites which are at risk of flooding.

In accordance with the planning guidelines, it is deemed that the proposed cycle route should be classified as “water compatible”.

### 3.1.6. Conclusion of Flood Risk Identification

The purpose of the Stage 1 Flood Risk Identification process is to establish whether a flood risk issue currently exists or may exist in the future. If a potential flood risk issue is identified the risk will be investigated in further detail by undertaking a Stage 2 – Initial Flood Risk Assessment. However, if no potential flood risk is identified then the overall assessment can conclude at this point.

In relation to the proposed Navan Cycle Scheme: R147 Poolboy Bridge to Kells Road Roundabout scheme in Navan, the basis of the Stage 1 - Flood Risk Identification findings discussed above highlight that the flood risk study has identified sections of the proposed site located within Flood Zone A, as such, these are at risk from fluvial flooding from the Boyne River.

However, the following should be noted:

- The proposed cycle route will be along existing R147/N51 Road infrastructure and will be implemented by introducing a new raised cycle track, however, this is predominantly located within Flood Zone C and only the eastern extents of the are located within Flood Zone A.
- The section of active travel scheme located within Flood Zone A is required to tie into the existing road levels at either end of the scheme and therefore no alternative route is proposed.
- The volume of displaced water due to the raised cycle track scheme will be minimal.
- The proposed active travel scheme is deemed to be “water compatible” and therefore a Stage 2 Flood Risk Assessment is not required.

Drainage works, which will run in tandem with the pavement construction phase, are minimal and restricted to areas where the scheme interfaces with the public road. The drainage works at these locations are limited to the relocation of existing road gullies with the larger existing road drainage infrastructure (i.e., carrier drains) not being altered or adjusted. During these works the main carrier drains will be isolated / blocked off from works activities / work zones to facilitate the reallocation of drainage gullies.

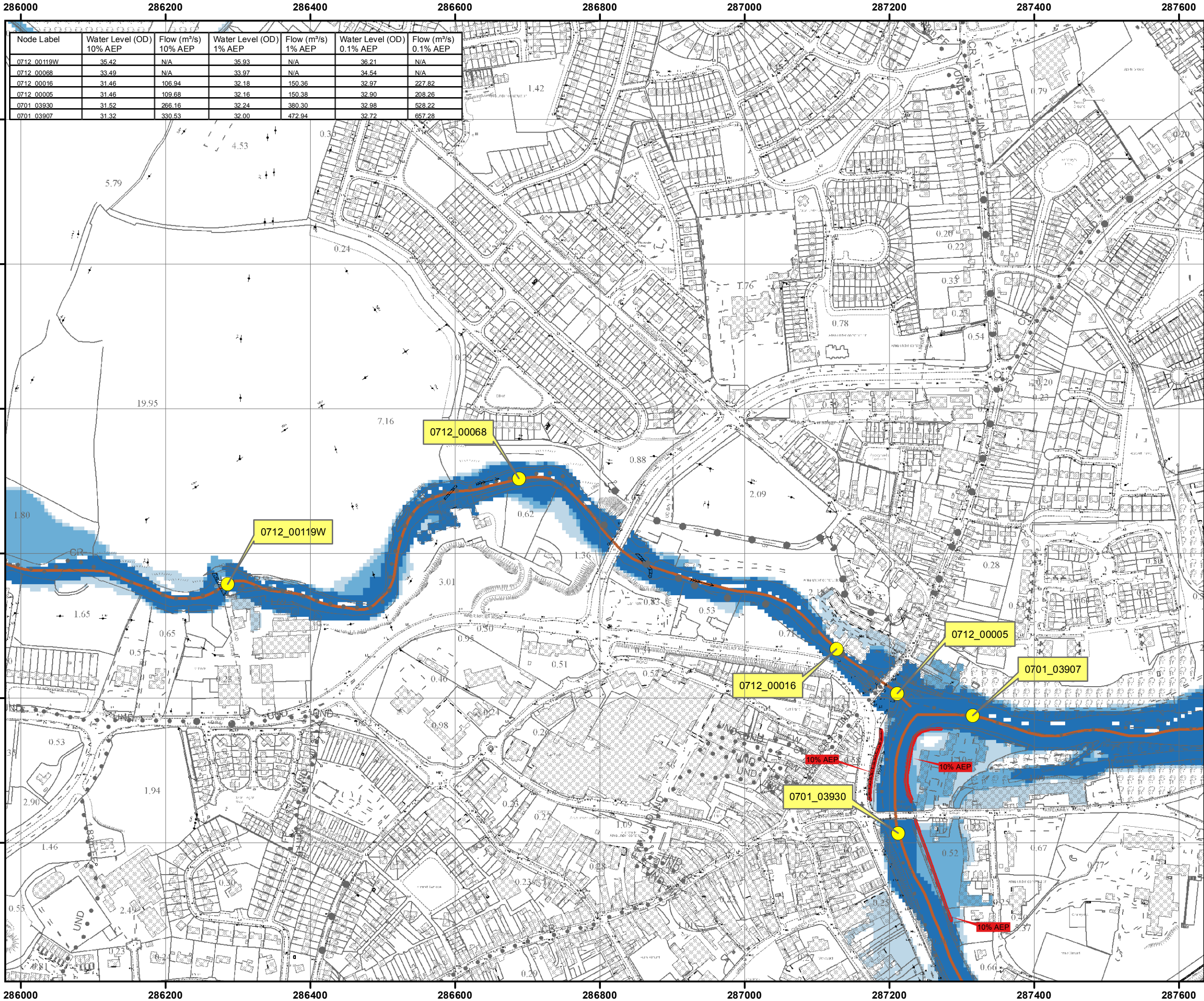
In view of records of Historic flooding within the proposed site, it is recommended that in advance of the construction stage of the proposed active travel scheme, the nominated contractor shall be aware of the potential for flooding within the area. During operational stage it will be the responsibility of Meath County Council to manage the proposed scheme during a Flood event.

Considering all the above, it is deemed that there will be no requirement to further review the risk of fluvial flooding at Stage 2 – Initial Flood Risk Assessment.

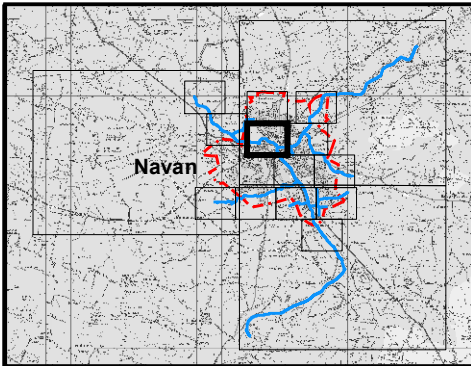
# Appendices

# Appendix A. Fluvial Flooding Extent Maps





Node Label	Water Level (OD) 10% AEP	Flow (m³/s) 10% AEP	Water Level (OD) 1% AEP	Flow (m³/s) 1% AEP	Water Level (OD) 0.1% AEP	Flow (m³/s) 0.1% AEP
0712_00119W	35.42	N/A	35.93	N/A	36.21	N/A
0712_00068	33.49	N/A	33.97	N/A	34.54	N/A
0712_00016	31.46	106.94	32.18	150.36	32.97	227.82
0712_00005	31.46	109.68	32.16	150.38	32.90	208.26
0701_03930	31.52	266.16	32.24	380.30	32.98	528.22
0701_03907	31.32	330.53	32.00	472.94	32.72	657.28



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
  - 1% AEP Standard of Protection of Flood Defence (Walls / Embankments)
  - 1% AEP
  - Node Point
  - Node ID Node Label

**FINAL**

REV: 03	NOTE: Amendment made to model	DATE: 16/11/17
REV: 02	NOTE: Flood Defences added to page 10	DATE: 26/10/17
REV: 01	NOTE: Flood Defences added to map.	DATE: 05/05/17





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Map:
Navan Fluvial Flood Extents
Map Type: EXTENT
Source: FLUVIAL
Map Area: HPW
Scenario: CURRENT
Drawn By : F.M.C. Date : 16 November 2017
Checked By : S.P. Date : 16 November 2017
Approved By : G.G. Date : 16 November 2017
Drawing No. : E07NAV_EXFCD_F3_10
Map Series : Page 10 of 16
Drawing Scale : 1:5,000 @ A3



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