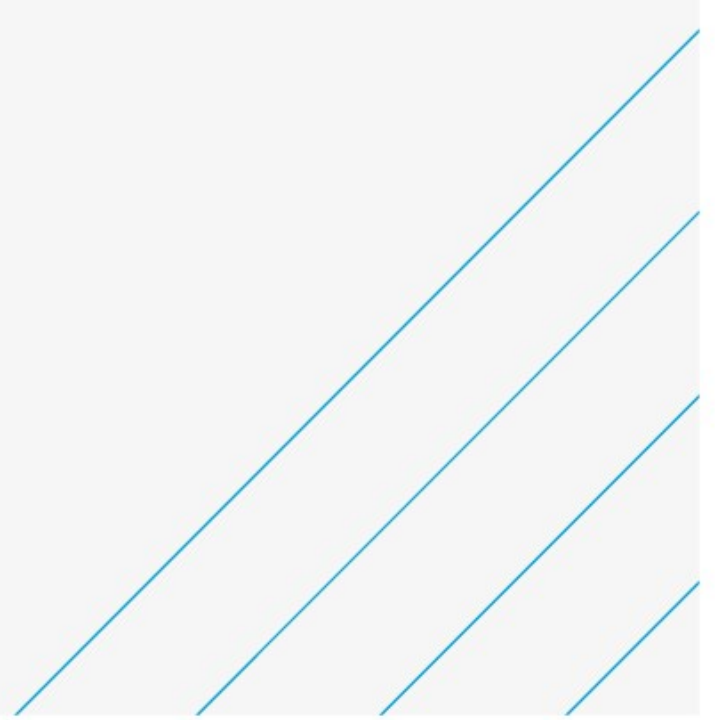


R147 Martha's Bridge to Circular Road

Flood Risk Assessment

Meath County Council

August 2022



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This document has 14 pages including the cover.

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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 Martha's Bridge to Circular Road 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

Flood Zone	Description
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 proposed site is located along the R147 Dublin Road, to the south of Navan town centre; with the extents of the cycle scheme running between the junctions of Springfield Glen/Dublin Road/Bother Sion (Martha's Bridge), incorporating Swan Lane and Dublin Road/Circular Road. The route runs parallel to the River Boyne (on the west side of the river). Figure 2-1 below illustrates the location and the extents of the route outlined in red.



Figure 2-1 - Site Location

2.2. Existing Site Conditions

The proposed site/route runs along the existing R147 Dublin Road. The River Boyne runs parallel to the site to the east of the proposed route. The site is comprised of predominantly hardstanding areas made up of roads and footpaths. There is also existing open space east of the site running parallel to the proposed cycle route, mainly comprised of trees and grass adjacent to the Boyne riverbank.

2.3. Topography

The proposed site for the cycle route falls from the R147/Swan Lane intersection in a northern westerly direction towards the R147/R161 intersection with levels falling from 39m AOD to 32m 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 Boyne River (IE_EA_07B041810) flows parallel to the site from south-east to north-west direction. The Boyne River is bridged at 2 No. locations adjacent to the proposed site, at the R147 Road / Bothar Sion Rd intersection and where the Navan railway line overpasses the R147 Road.

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.

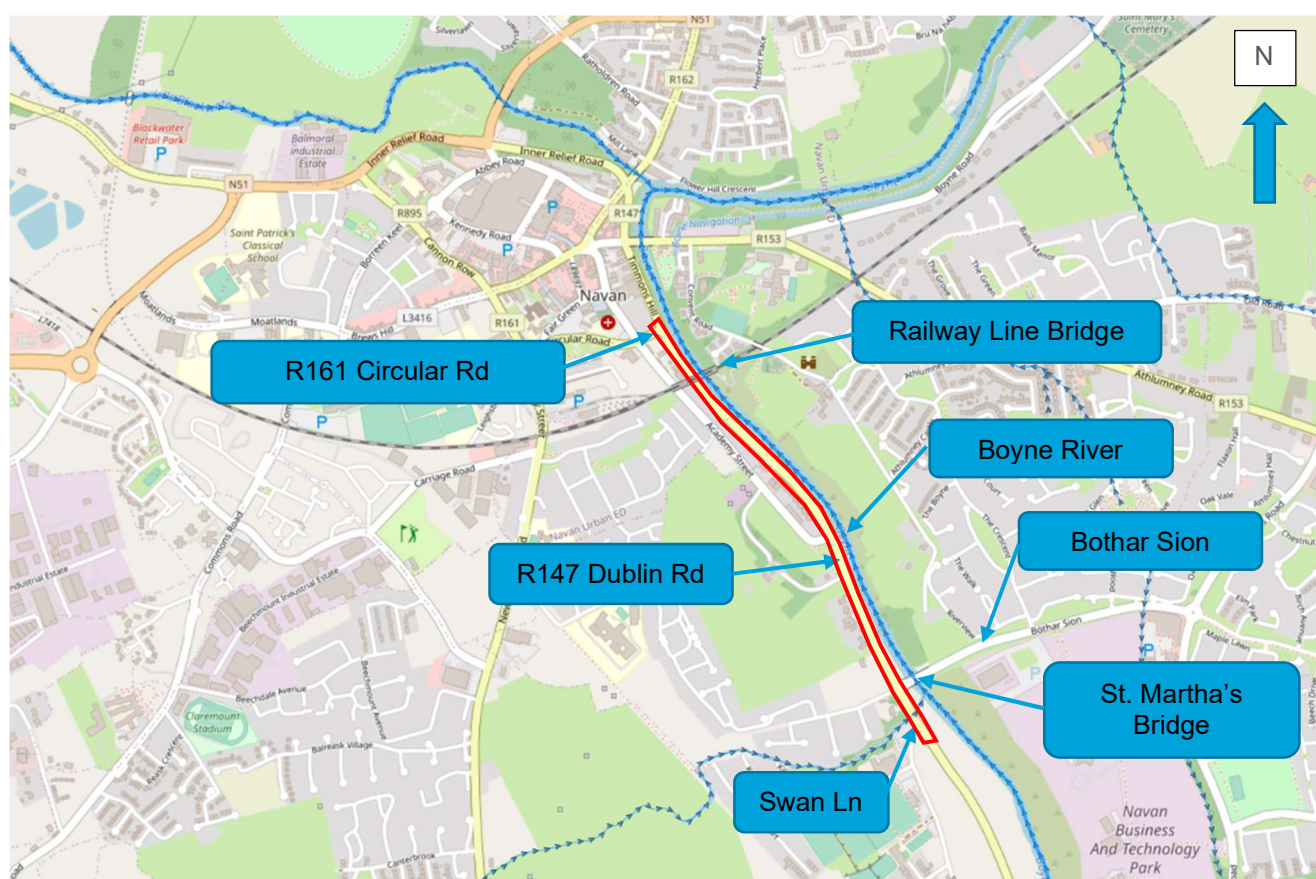


Figure 2-2 - Local Hydrology (EPA Envision)

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 R147 from Martha's Bridge to Circular Road Cycle Route in Navan 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 Boyne River is located parallel and adjacent to the proposed site.
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 (floodinfo.ie) 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	Two existing bridge locations adjacent to the proposed site have been identified, at the R147 Rd/Bothar Sion Rd intersection and the Railway Line bridge over the R147 Rd. Since the bridge was built in 1850's, 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 and all railway bridges are owned and maintained by Irish rail / CIE. Therefore, the risk of flooding from failure of infrastructure is not deemed to be significant.

Table 3-1 above indicates that the proposed site is at risk of fluvial flooding from the Boyne River

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. 2 No. fluvial maps specific to the site drawing No.s E07NAV_EXFCD_F3_09 and E07NAV_EXFCD_F3_10 have 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

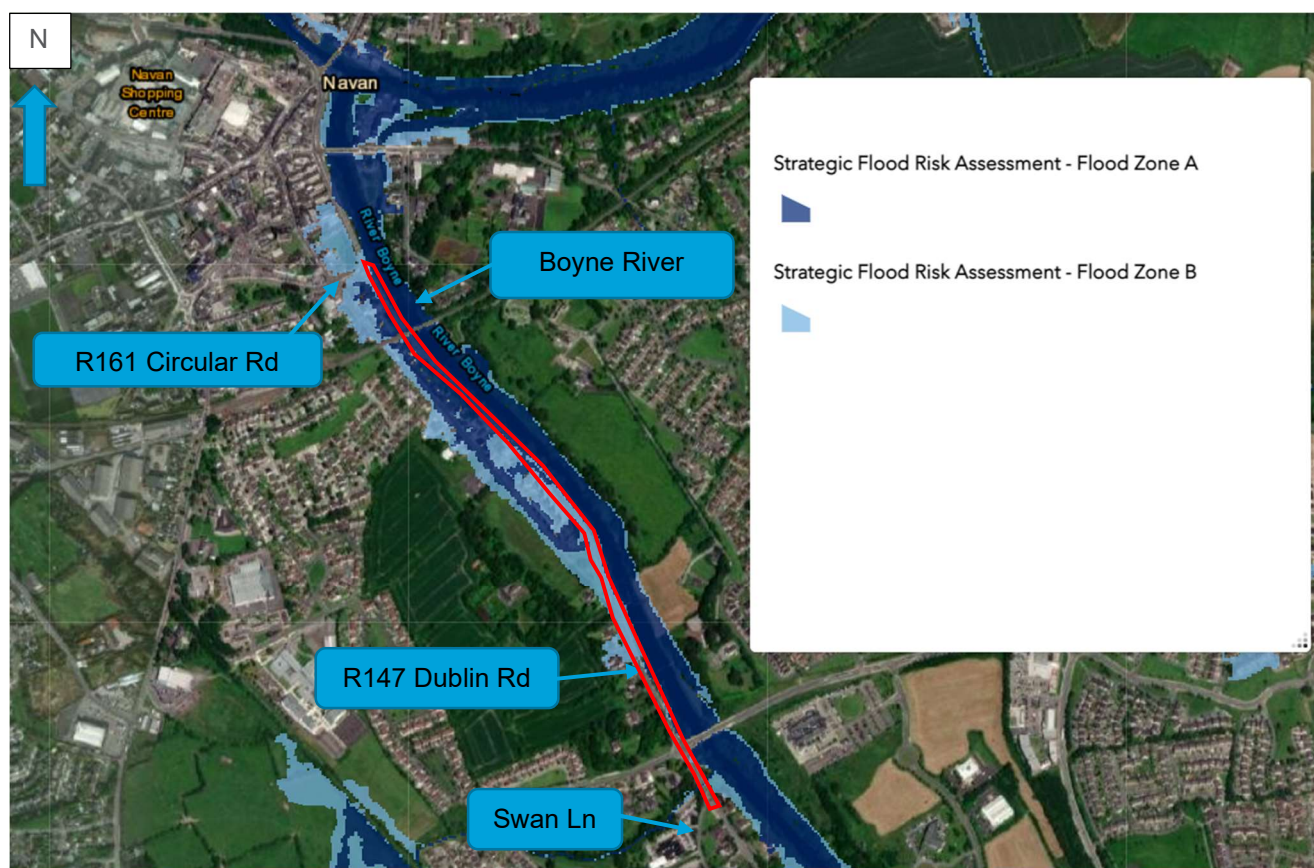


Figure 3-1 - Meath County SFRA Map

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. 25-inch map indicates river is "liable to flood" opposite Belmont house where road is located roughly at present. Beside this location, maps did not show any evidence of historic flooding along the Boyne 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. 2 No. single flood events were identified. The Boyne River is highlighted as the source of flooding. Refer to extract in Figure 3-2 below.

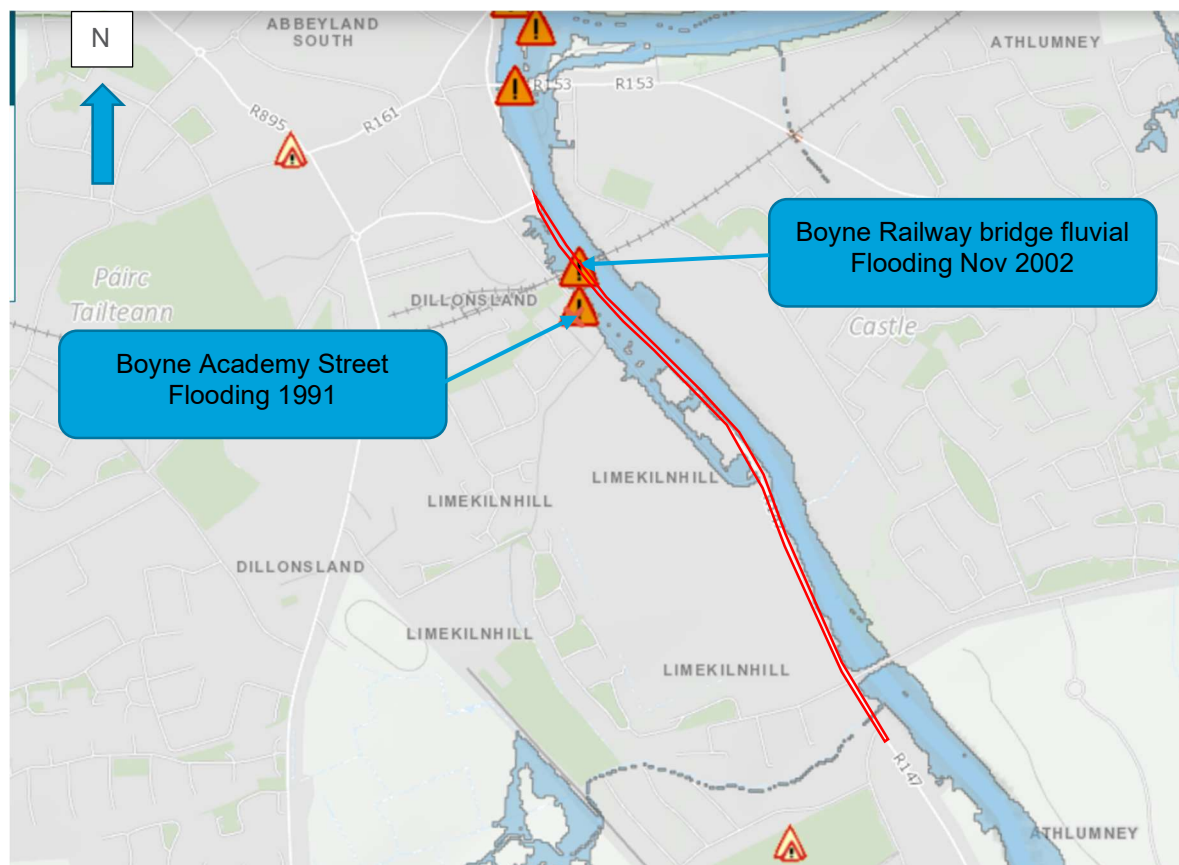


Figure 3-2 - Historic Flood Events

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 R147 Navan Cycle Route from Martha's Bridge to Circular Road in Navan based on the Stage 1 - Flood Risk Identification findings discussed above the flood risk study has identified that sections of the proposed site are in Flood Zone A and at risk from fluvial flooding from the Boyne River.

However, the following should be noted:

- The proposed cycle route will be along existing R147 Road infrastructure and will be implemented by introducing a new raised cycle track.
- The proposed site is within an existing built-up area and there will be no alteration to existing topography/ground levels within the site.

Drainage works, which will run in tandem with the pavement construction phase, are considered to be 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. The cycleway crosses 1 no. watercourse; Robinrath Stream (aka Swan River). The Robinrath Stream is culverted under the R147 and it is proposed to align the cycleway alongside and parallel to the roadway to span over the stream. It is proposed to utilise a precast deck unit of ca. 4m in length (steel or reinforced concrete) to span the open channel watercourse adjacent to the culvert. The deck unit will be installed on 2 no. reinforced concrete abutment walls, or similar to enable the ca. 4m span across the stream and avoid in-stream works. The concrete abutment walls will be poured in situ and will be located at a ca. 1m set back distance from the stream bank.

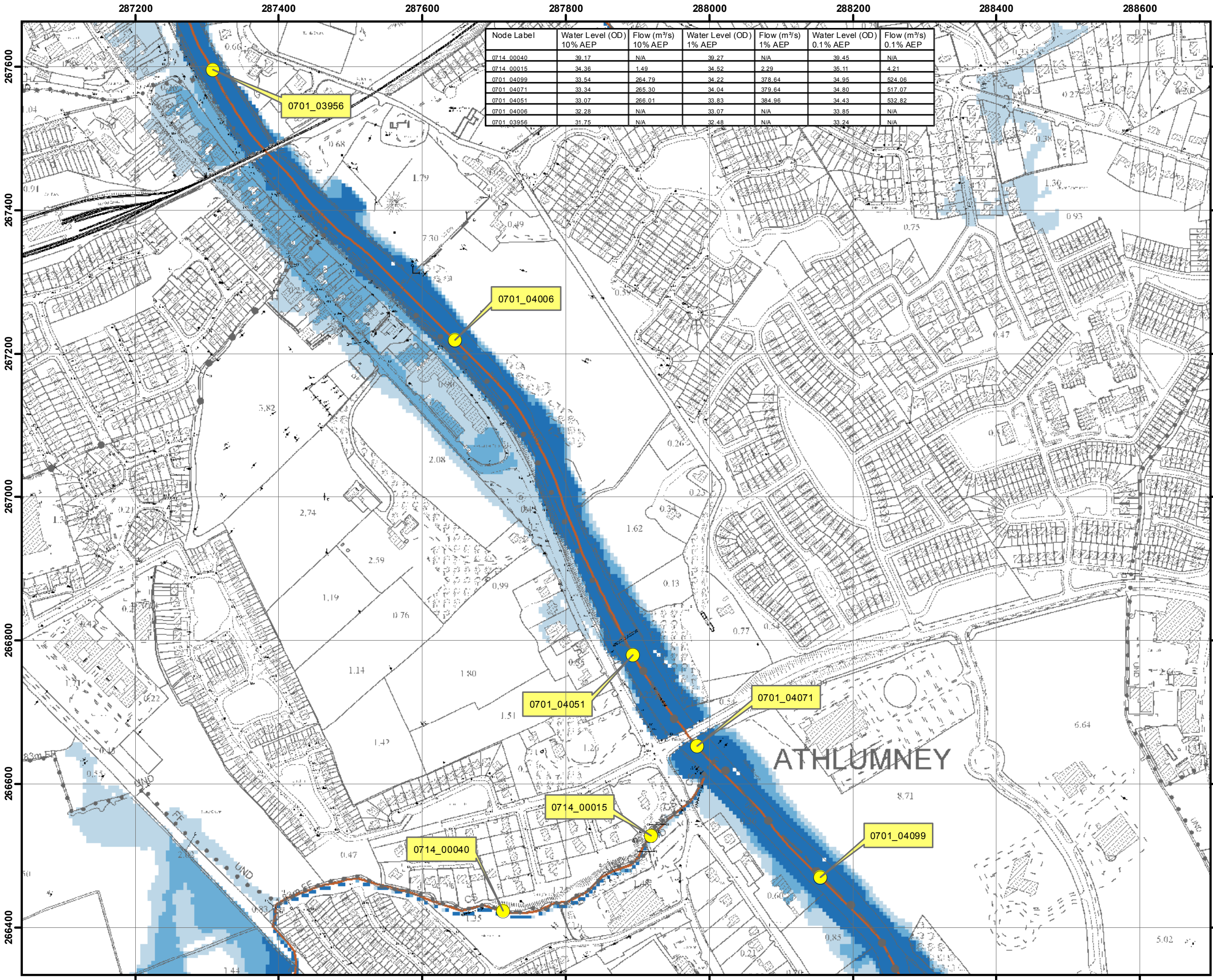
In view of records of Historic flooding within the proposed site, it is recommended that in advance of the construction stage of the proposed cycle route, the nominated contractor shall have in place a flood emergency plan so that any flooding from the River Boyne during construction stage can be mitigate against. During operational stage it will be the responsibility of Meath County Council to manage the proposed cycle track 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.

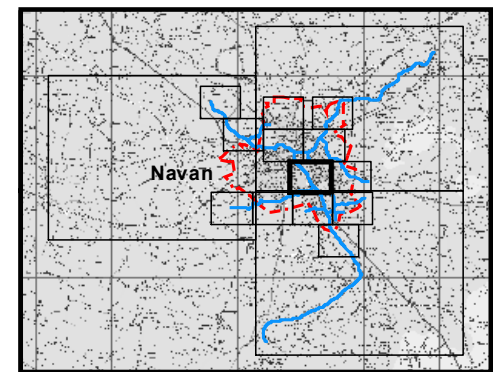
Appendices



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
0714_00040	39.17	N/A	39.27	N/A	39.45	N/A
0714_00015	34.36	1.49	34.52	2.29	35.11	4.21
0701_04099	33.54	264.79	34.22	378.64	34.95	524.06
0701_04071	33.34	265.30	34.04	379.64	34.80	517.07
0701_04051	33.07	266.01	33.83	384.96	34.43	532.82
0701_04006	32.28	N/A	33.07	N/A	33.85	N/A
0701_03956	31.75	N/A	32.48	N/A	33.24	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% 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)
 - 0.1% AEP Standard of Protection of Flood Defence (Walls / Embankments)
 - Node Point
 - Node ID Node Label

FINAL

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

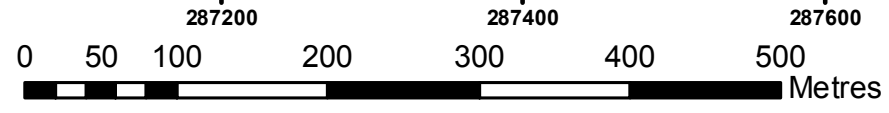
Checked By: S.P. **Date:** 16 November 2017

Approved By: G.G. **Date:** 16 November 2017

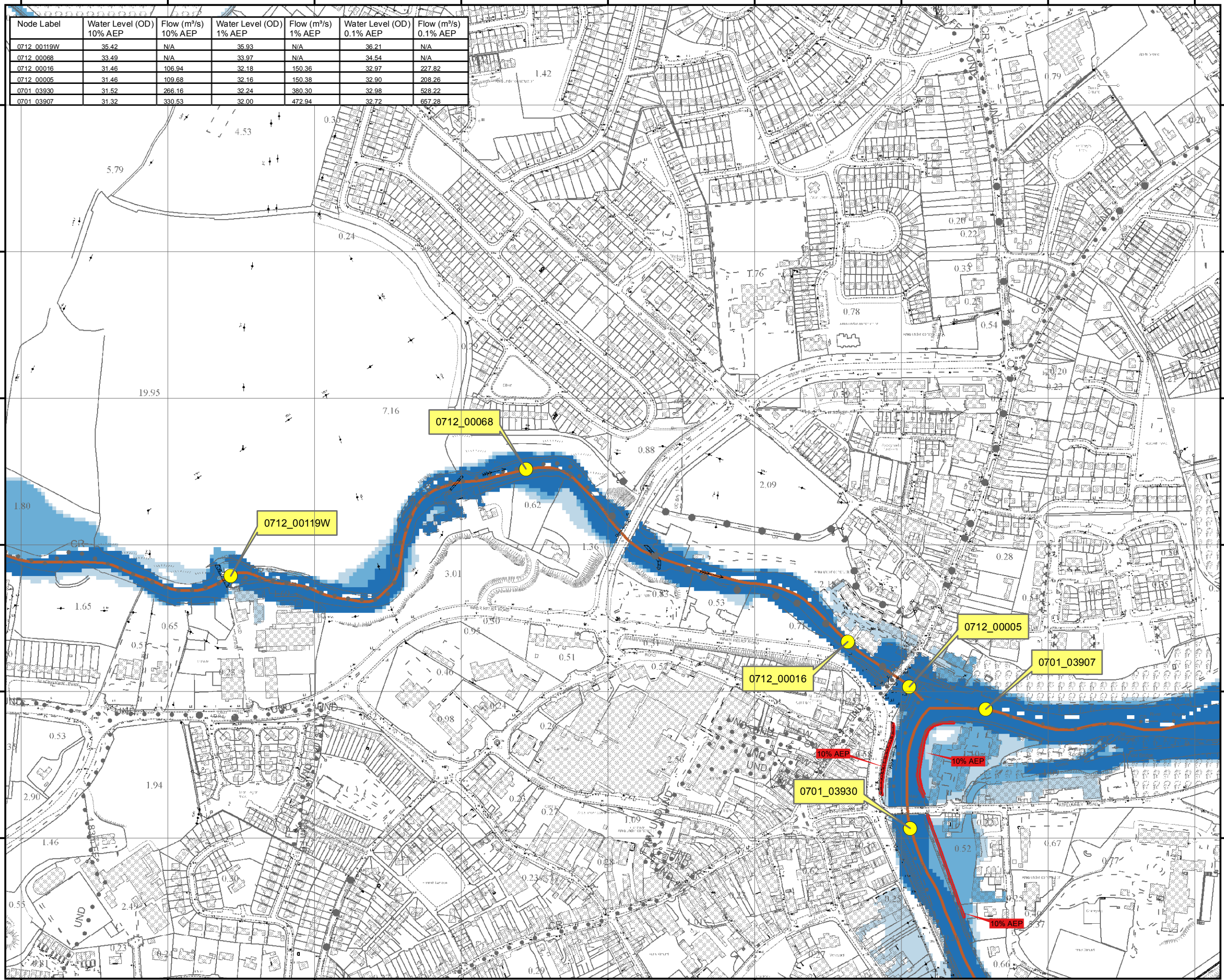
Drawing No.:
E07NAV_EXFCD_F3_09

Map Series: Page 9 of 16

Drawing Scale: 1:5,000 @ A3



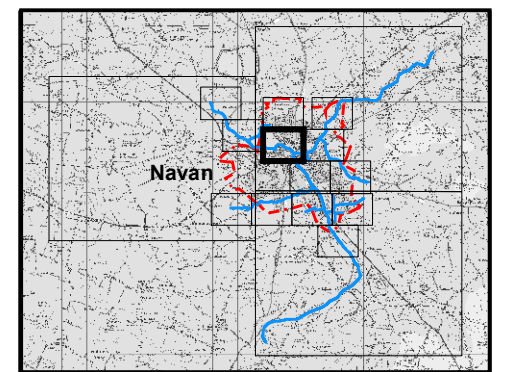
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Legend

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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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