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CONSULTANTS IN ENGINEERING, ENVIRONMENTAL SCIENCE & PLANNING

PART VIII PLANNING APPLICATION FOR THE NAVAN CCTV DEVELOPMENT SCHEME EXTENSION

FLOOD RISK ASSESSMENT

Prepared for: Meath County Council

comhairle chontae na mí
meath county council

Date: May 2022

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REVISION CONTROL TABLE, CLIENT, KEYWORDS AND ABSTRACT
User is responsible for Checking the Revision Status of This Document

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1	Issue for Planning	FNS/MG/AMW	KD/RD	BG	24.03.2022
2	Correction of no. CCTV poles	JG/BF	JON	BG	24.05.2022

Client: Meath County Council

Keywords: Flood Risk Assessment, Flood Risk Assessment, Stage 1, CCTV.

Abstract: Fehily Timoney & Company was commissioned by Meath County Council to prepare a Flood Risk Assessment in support of Part VIII Planning Application for the installation of 58 CCTV poles in Navan Town, Navan, Co. Meath. This Flood Risk Assessment was prepared in accordance with the guidelines produced by the Department of Environment, Heritage and Local Government (DoEHLG) – *"The Planning System and Flood Risk Management -Guidelines for Planning Authorities"* (November 2009).

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1. INTRODUCTION

1.1 Introduction

Fehily Timoney and Company (FT) was commissioned by Meath County Council (MCC) to prepare a Flood Risk Assessment (FRA) in support of Part VIII Planning Application for the installation of 58 CCTV poles in Navan Town, Navan, Co. Meath.

The flood risk assessment was prepared in accordance with the guidelines produced by the Department of Environment, Heritage and Local Government (DoEHLG) – *"The Planning System and Flood Risk Management - Guidelines for Planning Authorities"* (November 2009). This guideline will be referred to as the *Guidelines for Planning Authorities* for the remainder of this report

This report is to inform the planning authority regarding potential flood risks for the proposed development.

1.2 Scope

This FRA relates to the proposed development locations and its immediate surroundings only. This report uses information obtained from various sources, together with an assessment of flood risk for the existing site and proposed development. The list of sources is provided in Section 3.1.

1.3 National, Regional and Local Spatial Plans

The latest Development Plan to the site is the Meath County Development Plan 2021-2027. The policies and objectives set out in the Climate Change Strategy of this plan relating to flood protection are quoted below:

1.3.1 Objectives

1.3.1.1 Water Resource Management INF OBJ 25

To require the use of sustainable drainage systems (SuDS) to minimise and limit the extent of hard surfacing and paving and require the use of sustainable drainage techniques where appropriate, for new development or for extensions to existing developments, in order to reduce the potential impact of existing and predicted flooding risks.

1.3.1.2 Built Environment: Residential, Business and Industry and Services – INF OBJ 21

To restrict new development within floodplains other than development which satisfies the justification test, as outlined in the Planning System and Flood Risk Management Guidelines 2009 for Planning Authorities (or any updated guidelines).

1.3.2 Policies

1.3.2.1 Water Resource Management - INF POL 19

To implement the findings and recommendations of the Strategic Flood Risk Assessment prepared in conjunction with the County Development Plan review, ensuring climate change is taken into account.

1.3.2.2 Water Resource Management - INF POL 20

To require that a Flood Risk Assessment is carried out for any development proposal, where flood risk may be an issue in accordance with the "Planning System and Flood Risk Management – Guidelines for Planning Authorities" (DoECLG/OPW, 2009). This assessment shall be appropriate to the scale and nature of risk to and from the potential development and shall consider the impact of climate change.

1.3.2.3 Water Resource Management - INF POL 24

To ensure that flood risk management is incorporated into the preparation of Local Area Plans in accordance with 'The Planning System and Flood Risk Management - Guidelines for Planning Authorities (2009)'.

1.3.2.4 Water Resource Management - INF POL 26

To undertake a review of the 'Strategic Flood Risk Assessment for County Meath' in light of the completed flood mapping which has been developed as part of the Eastern Catchment Flood Risk Assessment and Management (CFRAM) Study.

1.3.2.5 Water Resource Management - INF POL 29

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 flood schemes being progressed through the planning process during the lifetime of the Plan. The provision of flood defences will be subject to the outcome of the Appropriate Assessment process.

1.3.2.6 Built Environment: Residential, Business and Industry and Services – INF POL 19

To implement the findings and recommendations of the Strategic Flood Risk Assessment prepared in conjunction with the County Development Plan review, ensuring climate change is taken into account.

1.3.2.7 Built Environment: Residential, Business and Industry and Services – INF POL 20

To require that a Flood Risk Assessment is carried out for any development proposal, where flood risk may be an issue in accordance with the "Planning System and Flood Risk Management – Guidelines for Planning Authorities" (DoECLG/OPW, 2009). This assessment shall be appropriate to the scale and nature of risk to and from the potential development and shall consider the impact of climate change.

1.3.2.8 Built Environment: Residential, Business and Industry and Services – INF POL 24

To ensure that flood risk management is incorporated into the preparation of Local Area Plans in accordance with 'The Planning System and Flood Risk Management -Guidelines for Planning Authorities (2009)'.

1.3.2.9 Built Environment: Residential, Business and Industry and Services – INF POL 26

To undertake a review of the 'Strategic Flood Risk Assessment for County Meath' in light of the completed flood mapping which has been developed as part of the Eastern Catchment Flood Risk Assessment and Management (CFRAM) Study.

1.3.2.10 Built Environment: Residential, Business and Industry and Services – INF POL 29

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 flood schemes being progressed through the planning process during the lifetime of the Plan. The provision of flood defences will be subject to the outcome of the Appropriate Assessment process.

1.4 Report Structure

The FRA Methodology is presented in Section 2 of this report and it considers the *Guidelines for Planning Authorities* as they relate to the proposed application.

The Stage 1 Flood Risk Identification is presented in Section 3.

Summary and conclusions are presented in Chapter 4.

1.5 Area of Development

Refer to Appendix 1 for Overview Map of the scheme and Appendix 2 for Location Maps[1] of proposed CCTV poles.

The proposed CCTV poles are scattered across Navan Town, Co. Meath. The CCTV poles are located on poles generally at major junctions and roadways throughout Navan Town. A variety of land uses can be found within close vicinity of the proposed poles such as commercial, residential, light industrial and recreational.

Some of the proposed poles are located at proposed future roads (future LDR 4, LDR 1b and the N51 Park & Ride Facility) and recently constructed roads (LDR 6) as indicated in the Location Maps provided in Appendix 2.

The confluence of the River Boyne and River Blackwater occurs within Navan town and comprises:

[1] It is noted that poles no. 1, 2, 3, 4, 5 and 6 are existing poles and do not form part of this planning application.

- The River Blackwater, a designated EPA watercourse (EPA Code: 07B01), crossing Navan Town flowing from the west and continuing in an easterly direction from its confluence with the River Boyne.
- The River Boyne, also a designated EPA watercourse (EPA Code: 07B04), crossing Navan Town flowing from the south and continuing in an easterly direction from its confluence with the River Blackwater.
- Smaller contributors to both River Blackwater and River Boyne throughout the Navan district.

Figure 1-1 below shows an overview of the river network in the district of Navan, Co. Meath.

Figure 1-1: Navan River Network

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TITLE:	Navan River Network
PROJECT:	Navan CCTV Poles
FIGURE NO:	1.1
CLIENT:	Meath County Council
SCALE:	1:20000
REVISION:	0
DATE:	05/01/2022
PAGE SIZE:	A3

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1.6 Proposed Development

Refer to Appendix 1 for Overview Map of the scheme and Appendix 2 for Location Maps of proposed CCTV poles.

The proposed development comprises the installation of 58 CCTV poles throughout Navan Town. The proposed poles range in height (from 7.3m to 10m) and each location will include a mixture of Pan Tilt Zoom (PTZ) and fixed mount cameras. All poles will be painted black. The installation of the proposed poles will require minor excavation works for its foundation and associated services finishing with a re-paving of the excavated area.

CCTV Poles will be connected by cable to public lighting network. It is intended to feed cables through existing ducts wherever possible, however some new cable ducts will need to be installed at locations further out from the town centre but it is expected these will cover only short distances between the existing services and mini-pillars situated adjacent to and serving the CCTV poles (< 5 metres). The installation of these ducts will require minor excavation works followed by hardcore overfilling and re-paving.

2. FLOOD RISK ASSESSMENT METHODOLOGY

2.1 General

The *Guidelines for Planning Authorities* and its Technical Appendices outline the requirements for a Flood Risk Assessment. 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* are to 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.

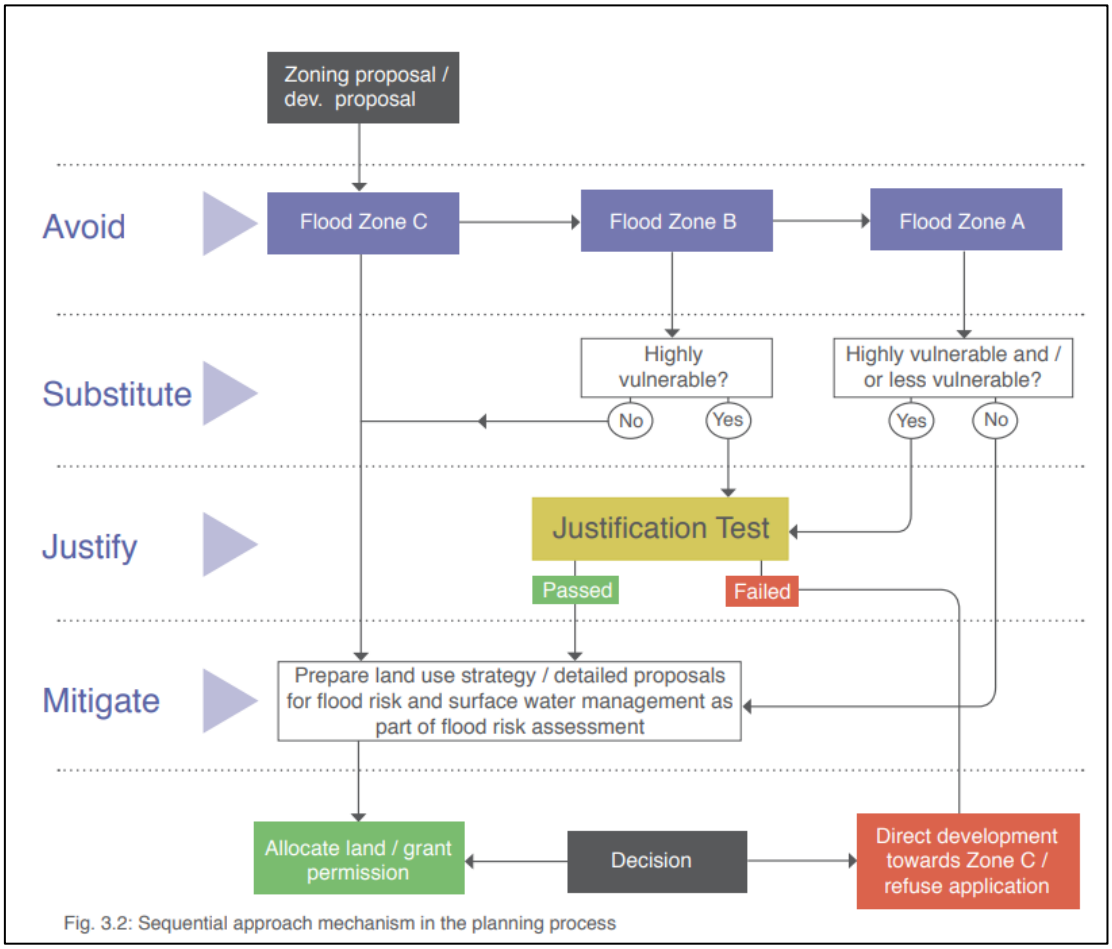

Figure 2-1: Sequential Approach Mechanism[2]

[2] 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 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.

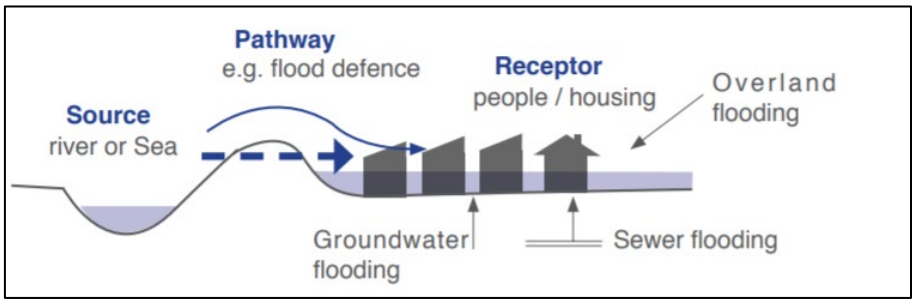

Figure 2-2: Source-Pathway- Receptor Model[3]

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. 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. These flood zones are split into three categories in the *Guidelines for Planning Authorities*.

- **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).

[3] 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,...).

Full list of types of development and related vulnerability classes are provided in Table 3.1 of the *Guidelines for Planning Authorities*. 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 2-1 identifies the types of development appropriate for each flood zone and those that will require a Justification Test:

Table 2-1: Matrix of Vulnerability Versus Flood Zone[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

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. The test comprised the following two processes:

- 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*.

2.5 Flood Risk Assessment Stages

The *Guidelines for Planning Authorities* outline that a staged approach should be adopted when carrying out a FRA.

These stages, see also Figure 2-3 below are:

- Stage 1 Flood Risk Identification.
- Stage 2 Initial Flood Risk Assessment (if required).
- Stage 3 Detailed Flood Risk Assessment (if required).

Shapes FRA

Influences FRA

	Flood risk identification	Initial flood risk assessment	Detailed flood risk assessment
Regional Flood Risk Appraisal	✓	U	U
Strategic Flood Risk assessment – County-wide	✓	P	U
Strategic Flood Risk Assessment – City or town within a county plan	✓	✓	P
Site-specific flood risk assessment	✓	✓	✓

P = Probably needed to meet the requirements of the Justification Test

U = Unlikely to be needed

✓ = Required to be undertaken

Figure 2-3: Flood risk assessment stages required per scale of study undertaken[5]

Stage 1: Flood risk identification – to identify whether there may be any flooding or surface water management issues relating to the proposed development site that may warrant further investigations. Flood risk identification stage uses existing information to identify whether there may be any flooding or surface water management issues related to the site. Flood risks identified in this stage are then addressed in Stage 2.

Stage 2: Initial flood risk assessment – to confirm sources of flooding that may affect the development site, to appraise the adequacy of existing information and to determine what surveys and modelling approach is appropriate to match the spatial resolution required and complexity of the flood risk issues. This stage involves the review of data addressed in Stage 1. Data where the flood risk at the site is recognized as being low is screened out and it is not further addressed in the report, data which recognized the flood risk on the site to be medium or high is further analyzed in the report.

[5] Source: Appendix A of *Guidelines for Planning Authorities*, Table A3.

Stage 3: Detailed flood risk assessment – to assess flood risk issues in sufficient detail and to provide a quantitative appraisal of potential flood risk to a proposed or existing development, of its potential impacts on flood risk elsewhere and of the effectiveness of any proposed mitigation measures. This will typically involve use of an existing or construction of a hydraulic model across a wide enough area to appreciate the catchment wide impacts and hydrological process involved.

3. STAGE 1 – FLOOD RISK IDENTIFICATION

3.1 Information Sources

The flood risk identification stage uses existing information to identify whether there may be any flooding or surface water management issues related to the site.

Data required for the flood risk identification was obtained from various sources listed in Table 3.1 below:

Table 3-1: Information Sources

Information Type	Source Consulted
Predictive and historic flood maps and events, and Benefiting Lands Maps;	Available on: www.floodinfo.ie
Predictive flood maps produced under the CFRAM Studies;	Available on: www.floodinfo.ie
River Basin Management Plans and reports;	OPW Flood Risk Management Plan for River Basin 07 (2018)
Existing Flood Risk Assessments;	Flood Risk Assessment and Management Plan for the Meath CDP 2021-2027 (JBA, 2019)
Consultation with Local Authorities who may be able to provide knowledge on historic flood events and local studies etc.;	MCC
Alluvial deposit and groundwater flooding maps of the Geological Survey of Ireland (GSI);	Available at https://www.gsi.ie
'Liable to flood' markings on the old '6 Inch' maps;	Historic OSI maps
National, regional and local spatial plans, such as the National Spatial Strategy, regional planning guidelines, development plans and local area plans provide key information on existing and potential future receptors.	Meath County Development Plan 2021-2027

3.2 Coastal/Tidal Flooding

Navan Town is located approximately 30 km west of the Irish Sea therefore coastal/tidal flooding is not considered a risk to the proposed development.

3.3 Groundwater Flooding

There are no indications of groundwater flooding in Navan Town from the GSI data available and any of the sources listed in Table 3-1.

3.4 Fluvial Flooding

3.4.1 Predictive Flood Maps: www.floodinfo.ie

Refer to Appendix 3 for relevant predictive flood maps covering the corresponding locations of the proposed CCTV poles. Table 3-2 below assigns each CCTV Location Map in Appendix 2 to the respective flood map in Appendix 3[6] to facilitate the location of the proposed poles within the predictive flood maps.

Table 3-2: Assignation of CCTV Location Map with respective predictive flood maps

CCTV Location Map (Appendix 2)	Predictive Flood Map (Appendix 3)
Drawing - DG9021	E07NAV_EXFCD_F3_10
Drawing -DG9022	E07NAV_EXFCD_F3_10
Drawing -DG9023	E07NAV_EXFCD_F3_10
Drawing -DG9024	E07NAV_EXFCD_F3_10 and E07NAV_EXFCD_F3_09
Drawing -DG9025	No predictive flood map available for this area. Online map available in www.floodinfo.ie does not indicate flooding in this area.
Drawing -DG9026	No predictive flood map available for this area. Online map available in www.floodinfo.ie does not indicate flooding in this area.
Drawing -DG9027	E07NAV_EXFCD_F3_09
Drawing -DG9028	E07NAV_EXFCD_F3_09 and E07NAV_EXFCD_F3_14
Drawing -DG9029	E07NAV_EXFCD_F3_08
Drawing -DG9030	E07NAV_EXFCD_F3_05
Drawing -DG9031	E07NAV_EXFCD_F3_05
Drawing -DG9032	E07NAV_EXFCD_F3_06
Drawing -DG9033	E07NAV_EXFCD_F3_14 and E07NAV_EXFCD_F3_15
Drawing -DG9034	E07NAV_EXFCD_F3_13
Drawing -DG9035	E07NAV_EXFCD_F3_13

The predictive flood maps indicate that most of the proposed CCTV poles are located outside the fluvial flood risk area, with the exception of pole no. 41 (Academy Street/R147 junction), which is located within the 0.1% Fluvial AEP flood extent (Flood Zone B).

[6] Note that the CCTV poles locations provided in the predictive flood maps in Appendix 3 are indicative only.

Additional data sets available in www.floodinfo.ie for the Mid-Range Future Scenario (MRFS)[7] of the CFRAM River Flood Extents show that pole no. 60 (Ratholden Road/Clonmaggaden Road junction) is within the MRFS predicted extents.

3.4.2 Existing Flood Risk Assessments: Flood Risk Assessment and Management Plan for the Meath CDP 2021-2027

The CDP developed by MCC includes an online consultation flood risk map along with a Flood Risk Assessment and Management Plan report prepared by JBA Consulting (December 2019). The online flood map provides predictive Flood Zone A and Flood Zone B within Navan Town.

The information available indicate that most of the proposed CCTV poles are located outside the fluvial flood risk area with the exception of pole no. 41 (Academy Street/R147 junction) which is located within Flood Zone B.

3.4.3 OPW's Historic Flood Event Records

The OPW Past Flood Event Local Area Summary Reports included in Appendix 4 highlights previous flood events within a radius of 2.5 km of the four poles (no. 41 and 60) identified within the predictive flood extents in OPW's website www.floodinfo.ie and Meath CDP 2021-2027. A list of the most relevant historic flooding events are summarised below.

Two single flood events occurred in the proximity of proposed pole no. 41:

- Boyne Academy Street, Navan, 1991 (ID-711).
- Boyle Railway Bridge, Navan, 2002 (ID-5312).

No flood event is recorded in the proximity of proposed pole no. 60. The closest flood event to this location occurred approximately 1.5 km north-west in Windtown, Navan in 2000 (ID-712).

However, no flooding impacts were confirmed at the proposed location of the poles from the information available on the events.

3.4.4 Other Sources

Other information sources consulted for the flood risk identification exercise are outlined in Table 3-3 below:

[7] Modelled extents of the CFRAM Flood Extents taking into account the potential effects of climate change by increasing rainfall by 20% and sea level rise by 500mm.

Table 3-3: Other Information Sources Consulted

Information Source	Flood Risks Identified	Flood Risk
River Basin Management Plans and reports - OPW Flood Risk Management Plan for River Basin 07 (2018)	The report identifies Navan as an Area of Further Assessment (AFA) within the Preliminary Flood Risk Assessment (PFRA) Study.	No additional flood risk identified
Local Authorities – MCC	No additional flood risks identified from this source.	None indicated
GSI maps	No alluvium deposits identified.	None indicated
Historic OSI Maps	None	None indicated

3.5 Development Classification

The proposed development is not listed in Table 3.1 of the *Guidelines for Planning Authorities*. However it is determined for the purpose of this assessment that the proposed development shall be classified 'less vulnerable development' as it consists of the installation of utilities infrastructure, therefore not essential infrastructure, and is not a water-compatible type of development. Hence the proposed development is appropriate for Flood Zones B and C without the need for a justification test.

4. SUMMARY AND CONCLUSION

The Flood Risk Assessment - Stage 1 - FRI for the proposed installation of 58 CCTV poles throughout Navan Town was undertaken in accordance with the requirements of the guidelines produced by the Department of Environment, Heritage and Local Government (DoEHLG) – *"The Planning System and Flood Risk Management - Guidelines for Planning Authorities"* (November 2009).

A review of the information available indicate that the majority of the proposed CCTV poles are outside the flood risk areas presented in the various sources. However the following poles were identified within flood risk areas:

- Pole no. 41 (Academy Street/R147 junction): identified in Flood Zone B in predictive flood maps and Meath CDP 2021-2027.
- Pole no. 60 (Ratholden Road/Clonmaggaden Road junction): identified within the MRFS predicted extents in www.floodinfo.ie.

The proposed development is categorised as 'less vulnerable development' in this assessment. These types of developments are suitable for both Flood Zone B and Flood Zone C without the need of a justification test.

The installation of the proposed CCTV poles will require minor excavation and backfilling works in developed areas or in areas where future developments have been approved, therefore it is expected that the installation of the poles and associated services will not have a significant impact and will not increase the risk of flooding.

This study concludes that the proposed development is of low flood risk and no further flood risk assessment is required. This is in accordance with the Guidelines for Planning Authorities.

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APPENDIX 1

Overview Map

Refer to DG9035
Refer to DG9034
Refer to DG9021
Refer to DG9022
Refer to DG9023
Refer to DG9024
Refer to DG9025
Refer to DG9026
Refer to DG9027
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Refer to DG9032
Refer to DG9033

GENERAL NOTES

1. This drawing is the property of Meath County Council, it is a confidential document and must not be copied, used, or reproduced without prior written consent.
2. Unless stated otherwise, all levels refer to Ordnance Survey Datum, Malin Head, and all coordinates refer to Irish Transverse Mercator (ITM) Grid.
3. DO NOT SCALE, use figured dimensions only, if in doubt ask.

No.	Date	Amendment / Issue	Drn	Chk	App

Stage: PLANNING

Comhairle Chontae na Mí
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County Council

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Project:
NAVAN CCTV SCHEME
PART VIII PLANNING APPLICATION

Title:
OVERVIEW MAP

Drawn by:	Checked by:	Approved by:
SB	BM	CR

File Reference: TRA/08/08/01/99

Scale: NTS	Drg. No:	Rev:
Date: Sept 2021	DG9001	—

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A1 0 10 50 100

LEGEND

CCTV location Plan, for further details refer to associated drawings

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APPENDIX 2

CCTV Location Maps

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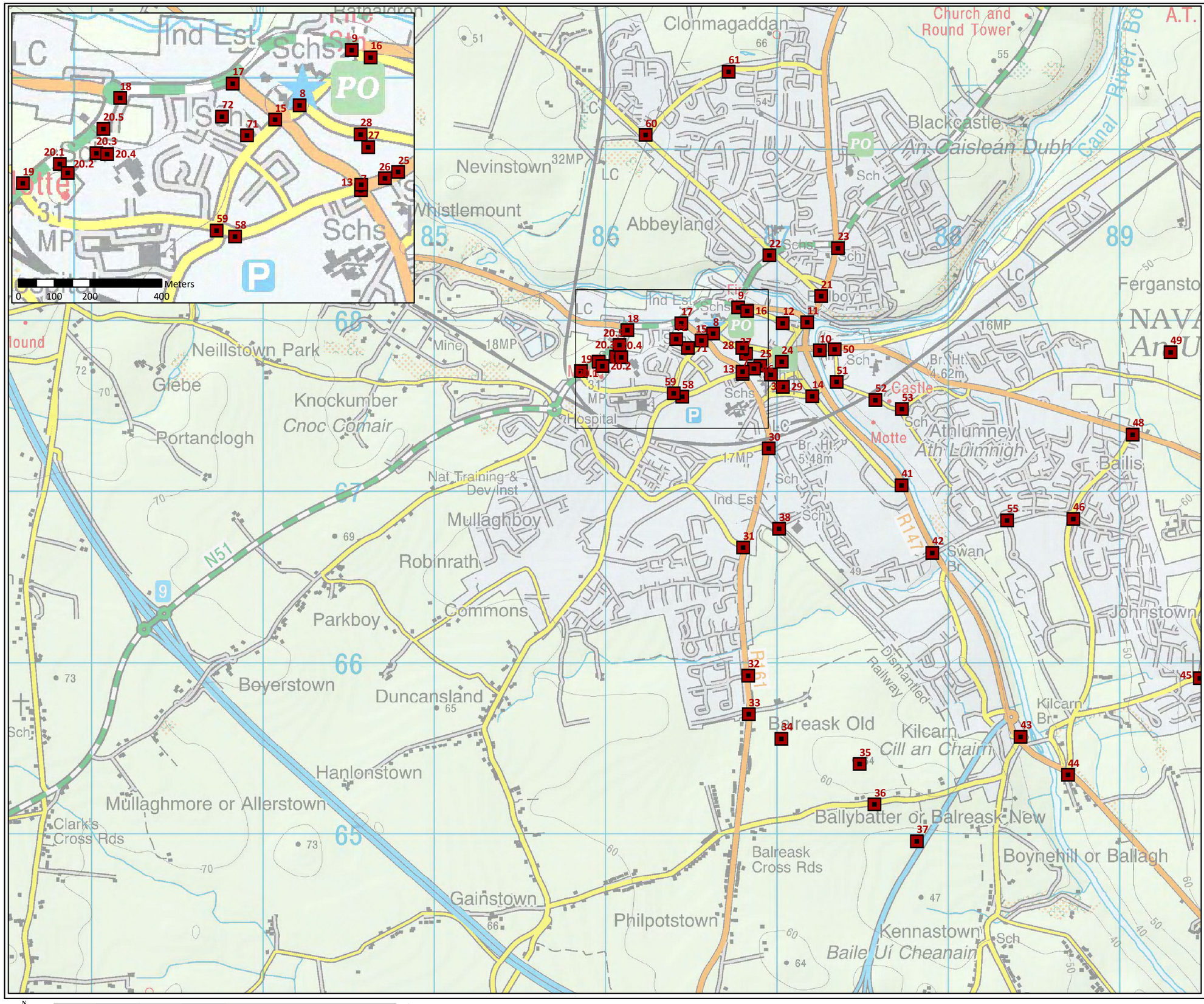

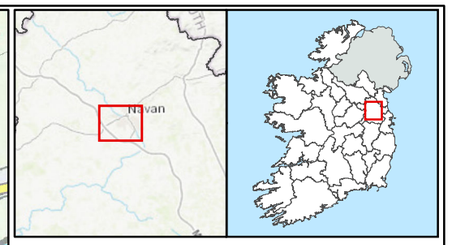

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DATE:	24/05/2022	**PAGE SIZE:**	A3

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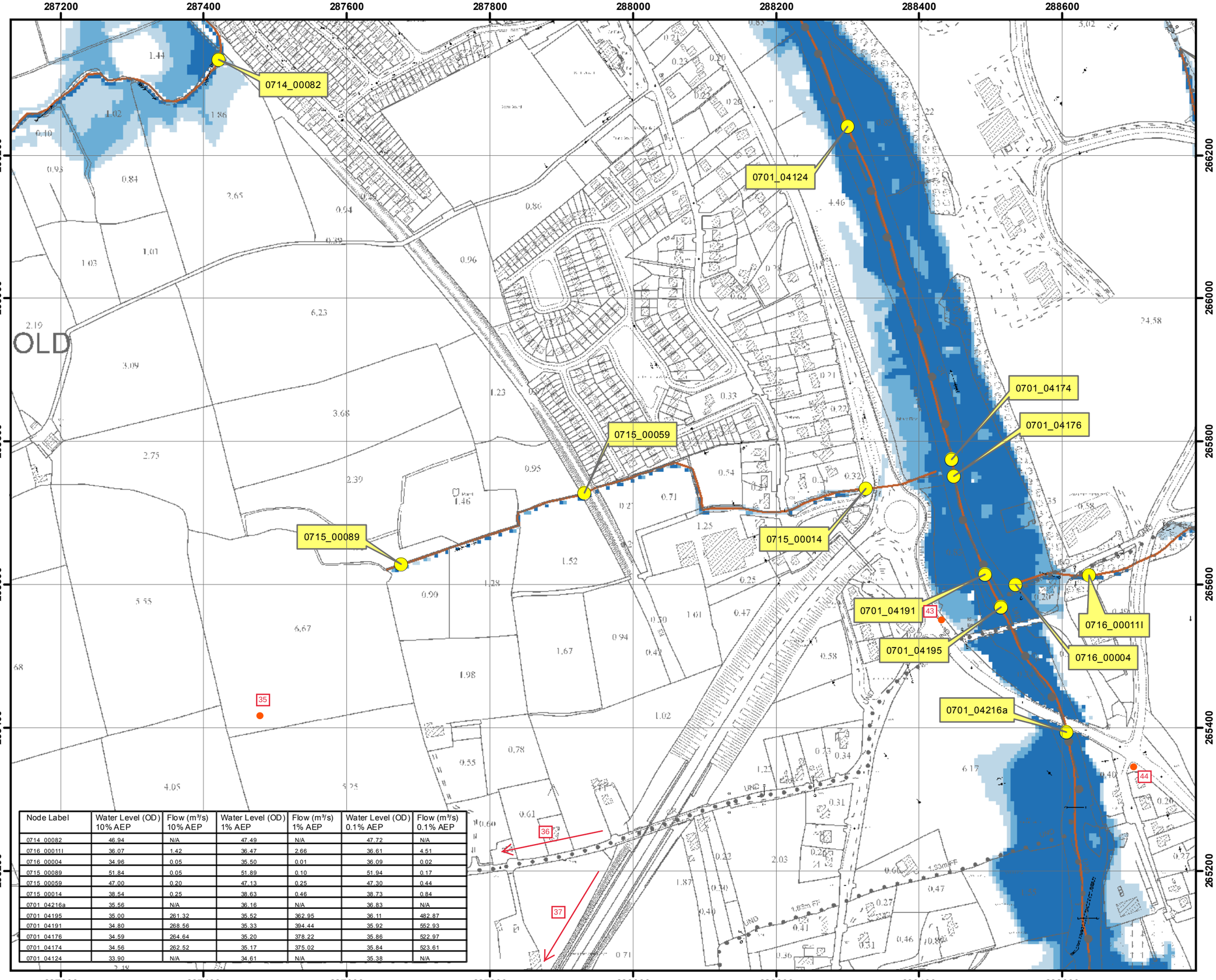
APPENDIX 3

Predictive Flooding Maps



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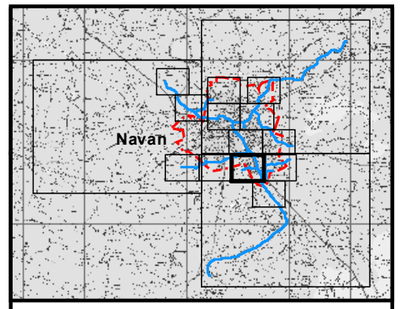
0716_00011I	36.07	1.42	36.47	2.66	36.61	4.51
0716_00004	34.96	0.05	35.50	0.01	36.09	0.02
0715_00089	51.84	0.05	51.89	0.10	51.94	0.17
0715_00059	47.00	0.20	47.13	0.25	47.30	0.44
0715_00014	38.54	0.25	38.63	0.46	38.73	0.84
0701_04216a	35.56	N/A	36.16	N/A	36.83	N/A
0701_04195	35.00	261.32	35.52	362.95	36.11	482.87
0701_04191	34.80	268.56	35.33	394.44	35.92	552.93
0701_04176	34.59	264.64	35.20	378.22	35.86	522.97
0701_04174	34.56	262.52	35.17	375.02	35.84	523.61
0701_04124	33.90	N/A	34.61	N/A	35.38	N/A



IMPORTANT USER NOTE:
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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
- 1% AEP (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

EASTERN CFRAM STUDY
CATCHMENT FLOOD RISK ASSESSMENT AND MANAGEMENT

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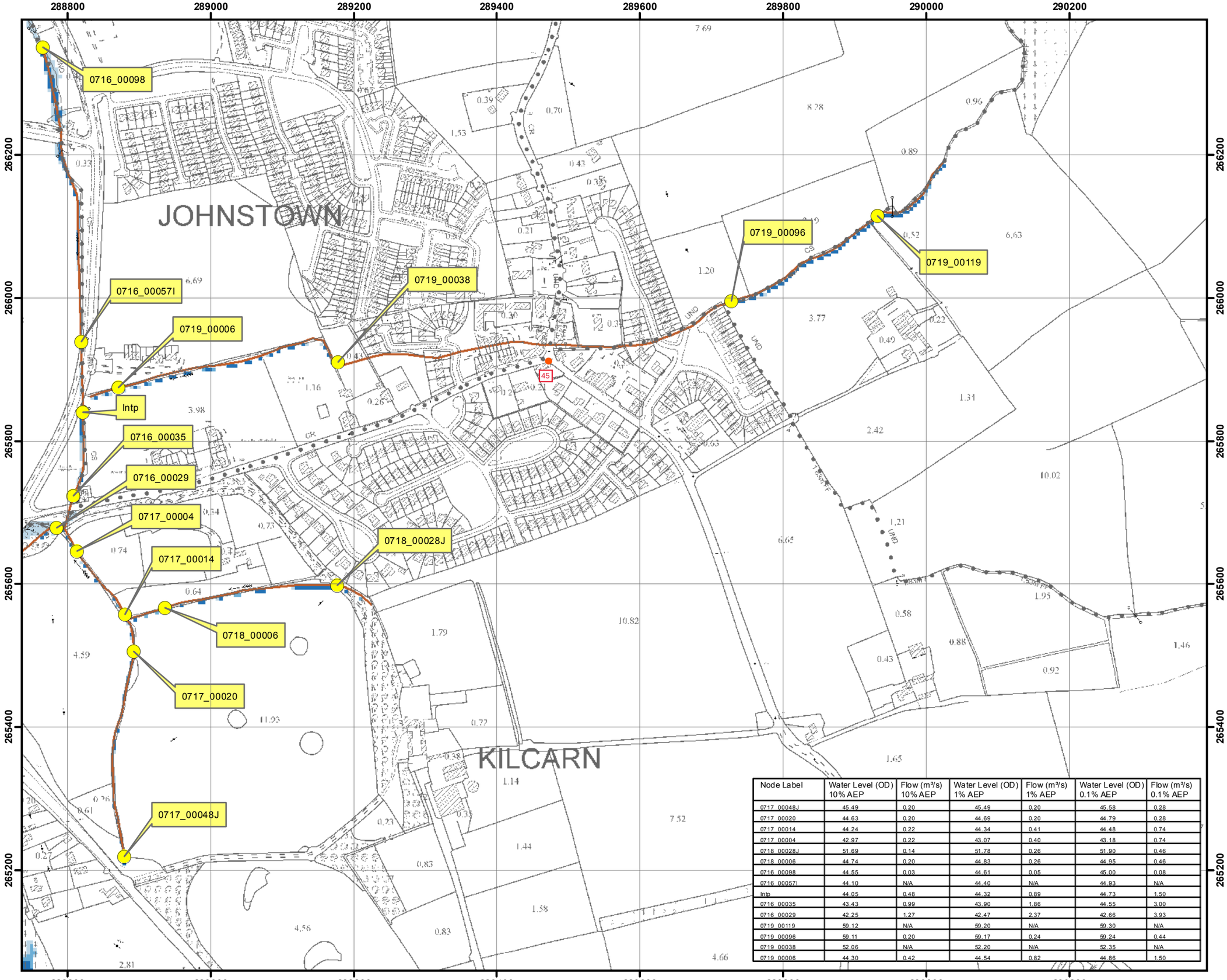
Map:
Navan Fluvial Flood Extents

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

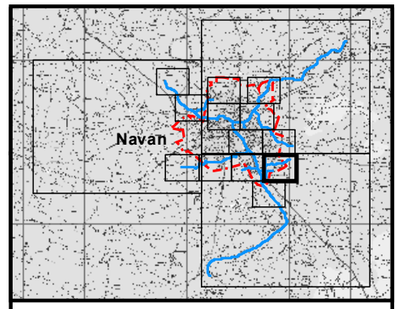
Drawing No. :
E07NAV_EXFCD_F3_05

Map Series : Page 5 of 16

Drawing Scale : 1:5,000 @ A3



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
0717_00048J	45.49	0.20	45.49	0.20	45.58	0.28
0717_00020	44.63	0.20	44.69	0.20	44.79	0.28
0717_00014	44.24	0.22	44.34	0.41	44.48	0.74
0717_00004	42.97	0.22	43.07	0.40	43.18	0.74
0718_00028J	51.69	0.14	51.78	0.26	51.90	0.46
0718_00006	44.74	0.20	44.83	0.26	44.95	0.46
0716_00098	44.55	0.03	44.61	0.05	45.00	0.08
0716_00057I	44.10	N/A	44.40	N/A	44.93	N/A
Intp	44.05	0.48	44.32	0.89	44.73	1.50
0716_00035	43.43	0.99	43.90	1.86	44.55	3.00
0716_00029	42.25	1.27	42.47	2.37	42.66	3.93
0719_00119	59.12	N/A	59.20	N/A	59.30	N/A
0719_00096	59.11	0.20	59.17	0.24	59.24	0.44
0719_00038	52.06	N/A	52.20	N/A	52.35	N/A
0719_00006	44.30	0.42	44.54	0.82	44.86	1.50



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Legend

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- 1% AEP (Walls / Embankments)
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FINAL

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

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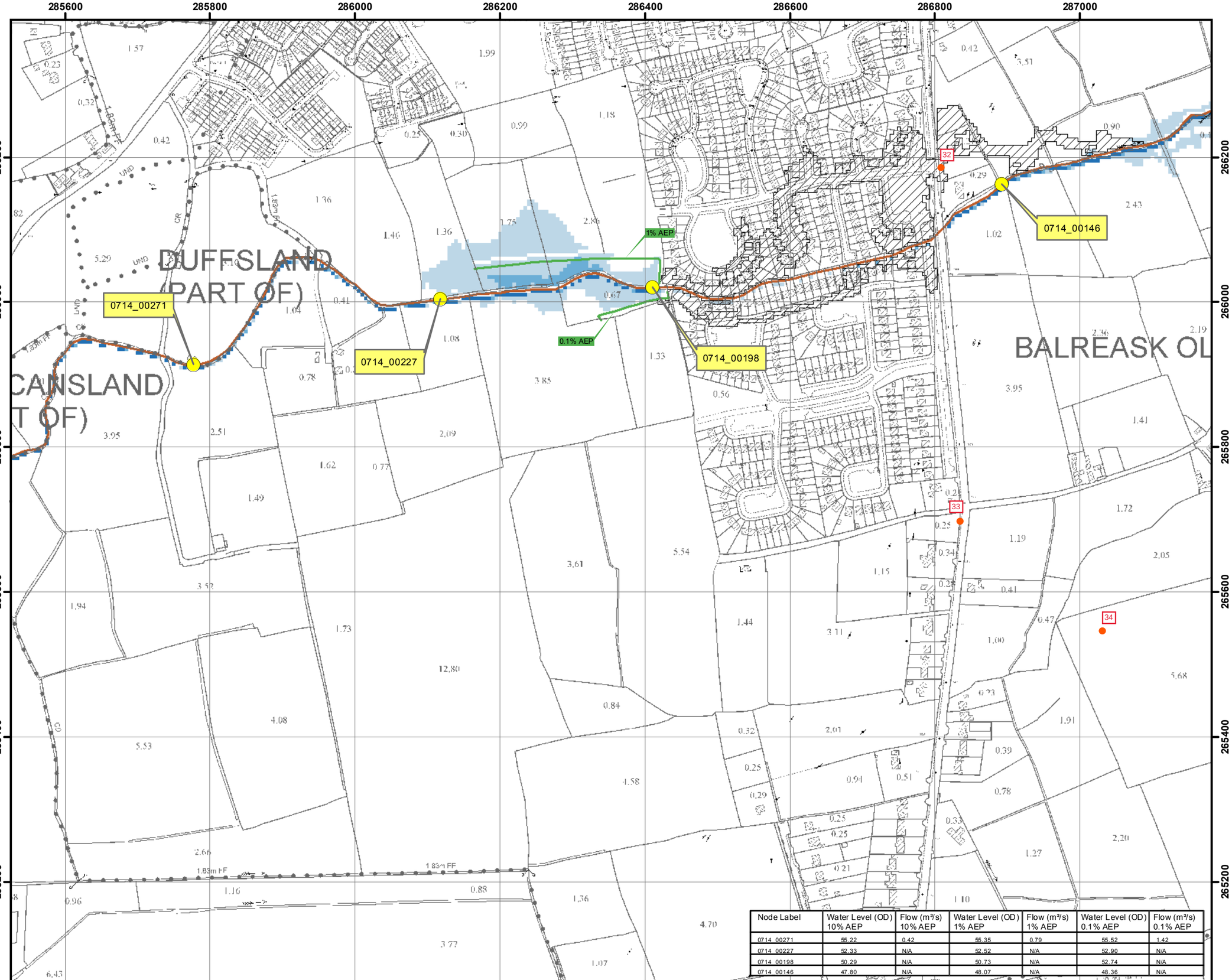
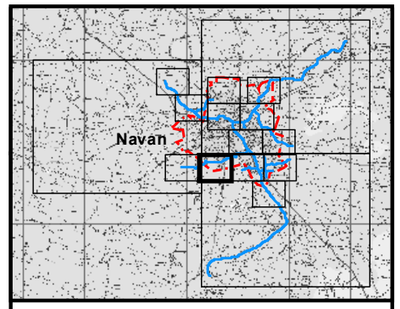
Map:
Navan Fluvial Flood Extents

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_06
Map Series : Page 6 of 16
Drawing Scale : 1:5,000 @ A3



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_00271	55.22	0.42	55.35	0.79	55.52	1.42
0714_00227	52.33	N/A	52.52	N/A	52.90	N/A
0714_00198	50.29	N/A	50.73	N/A	52.74	N/A
0714_00146	47.80	N/A	48.07	N/A	48.36	N/A



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Legend

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Map: Navan Fluvial Flood Extents

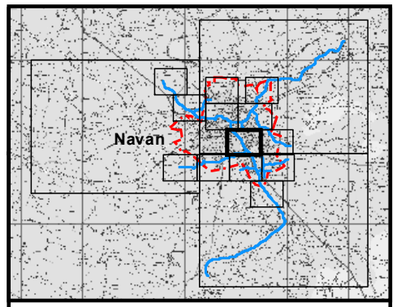
Map Type:	EXTENT		
Source:	FLUVIAL		
Map Area:	HPW		
Scenario:	CURRENT		
Drawn By :	F.M.C.	Date :	16 November 2017
Checked By :	S.P.	Date :	16 November 2017
Approved By :	G.G.	Date :	16 November 2017

Drawing No. : **E07NAV_EXFCD_F3_08**

Map Series : Page 8 of 16

Drawing Scale : 1:5,000 @A3

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



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- Node ID Node Label

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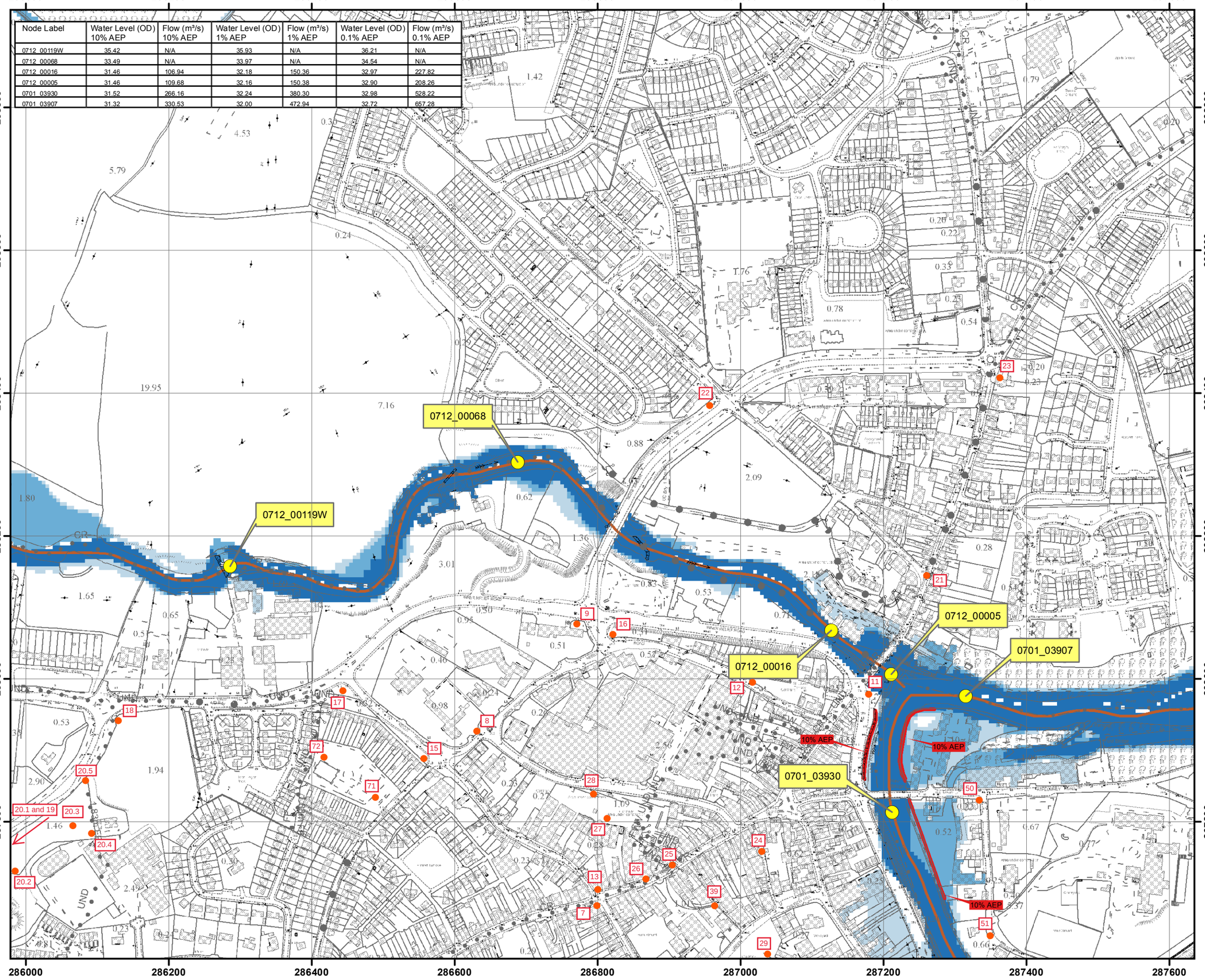
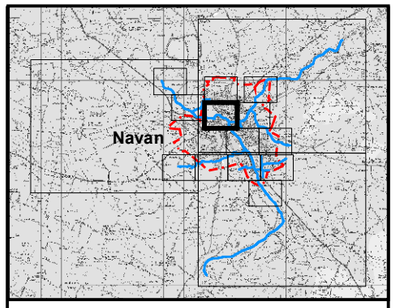
Map:
Navan Fluvial Flood Extents

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

0 50 100 200 300 400 500 Metres

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





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Legend

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- Embankment
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- 1% AEP
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FINAL

REV:	NOTE:	DATE:
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CATCHMENT FLOOD RISK ASSESSMENT AND MANAGEMENT

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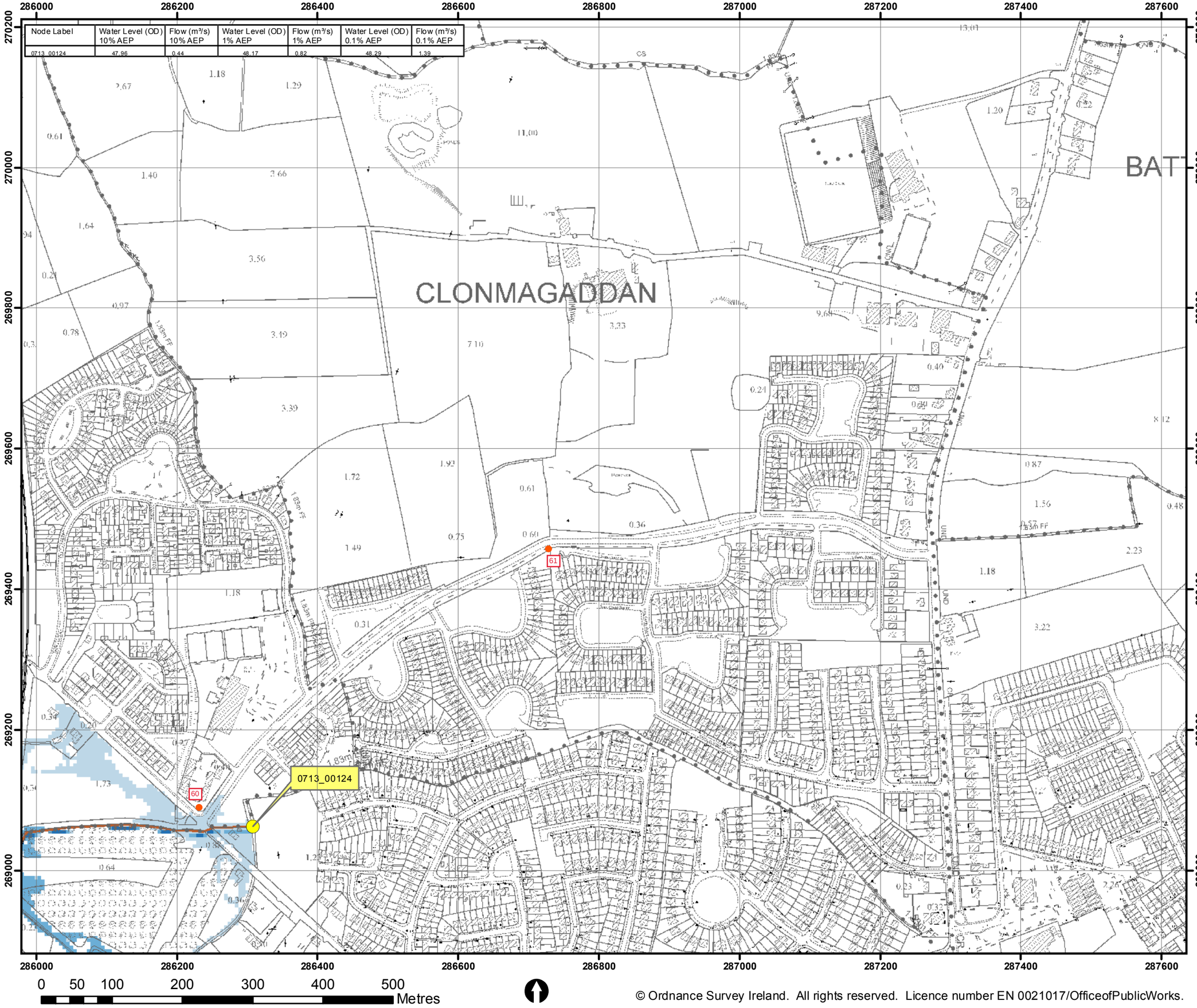
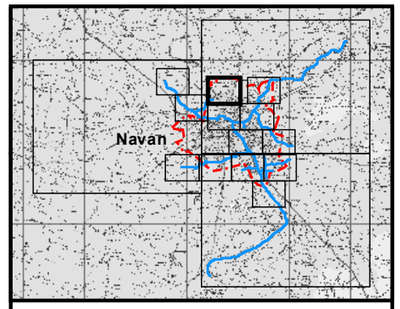
Map:
Navan Fluvial Flood Extents

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

0 50 100 200 300 400 500 Metres

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
0713_00124	47.96	0.44	48.17	0.82	48.29	1.39





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Legend

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- Wall
- Defended Area
- 1% AEP — Standard of Protection of Flood Defence
- 1% AEP — (Walls / Embankments)
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FINAL

REV:	NOTE:	DATE:
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02	Flood Defences added to page 10	26/10/17
01	Flood Defences added to map.	05/05/17

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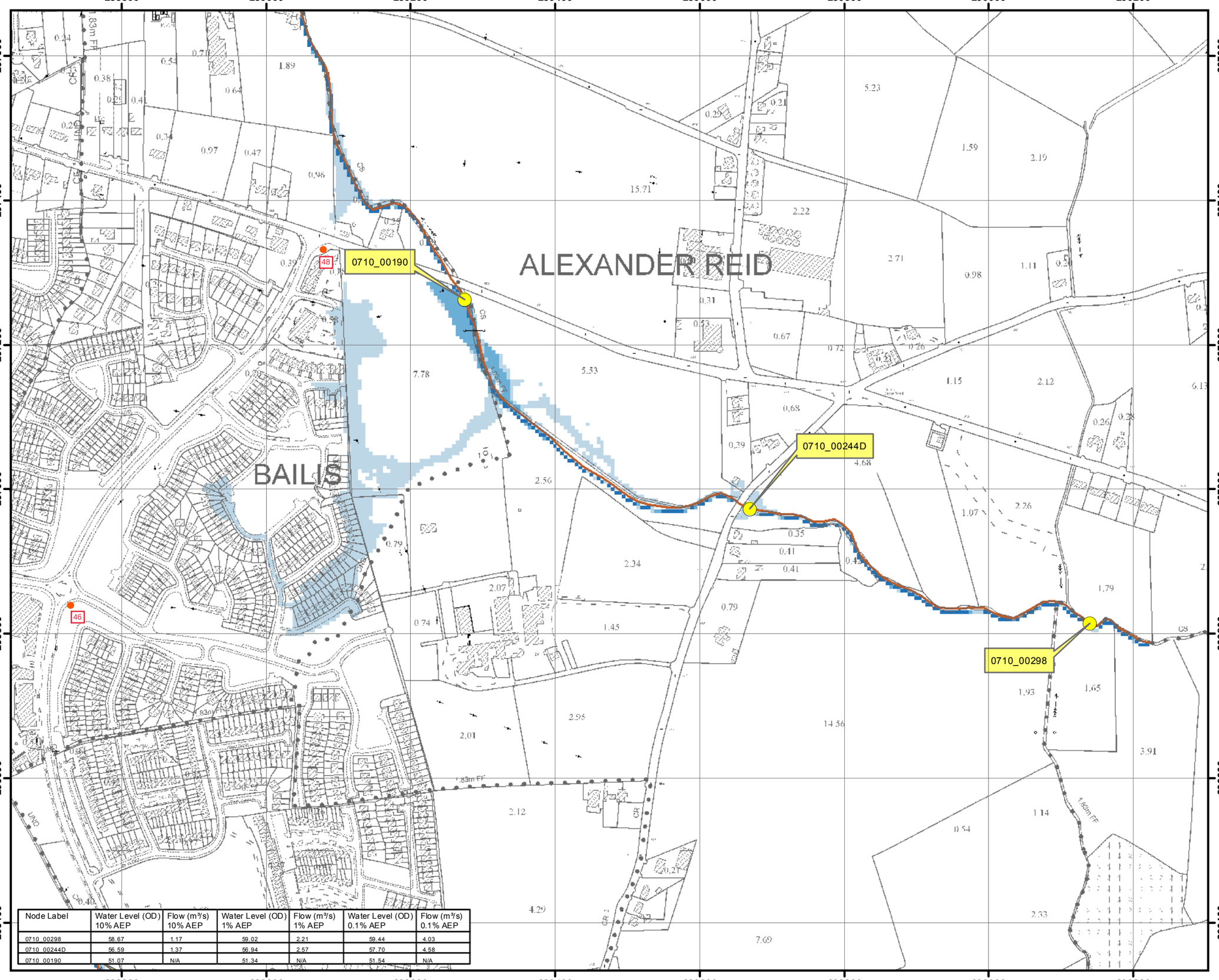
Map: Navan Fluvial Flood Extents

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_13

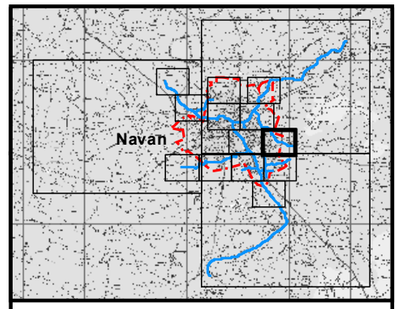
Map Series : Page 13 of 16

Drawing Scale : 1:5,000 @A3



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
0710_00298	58.67	1.17	59.02	2.21	59.44	4.03
0710_00244D	56.59	1.37	56.94	2.57	57.70	4.58
0710_00190	51.07	N/A	51.34	N/A	51.54	N/A

0 50 100 200 300 400 500 Metres



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FINAL

REV:	NOTE:	DATE:
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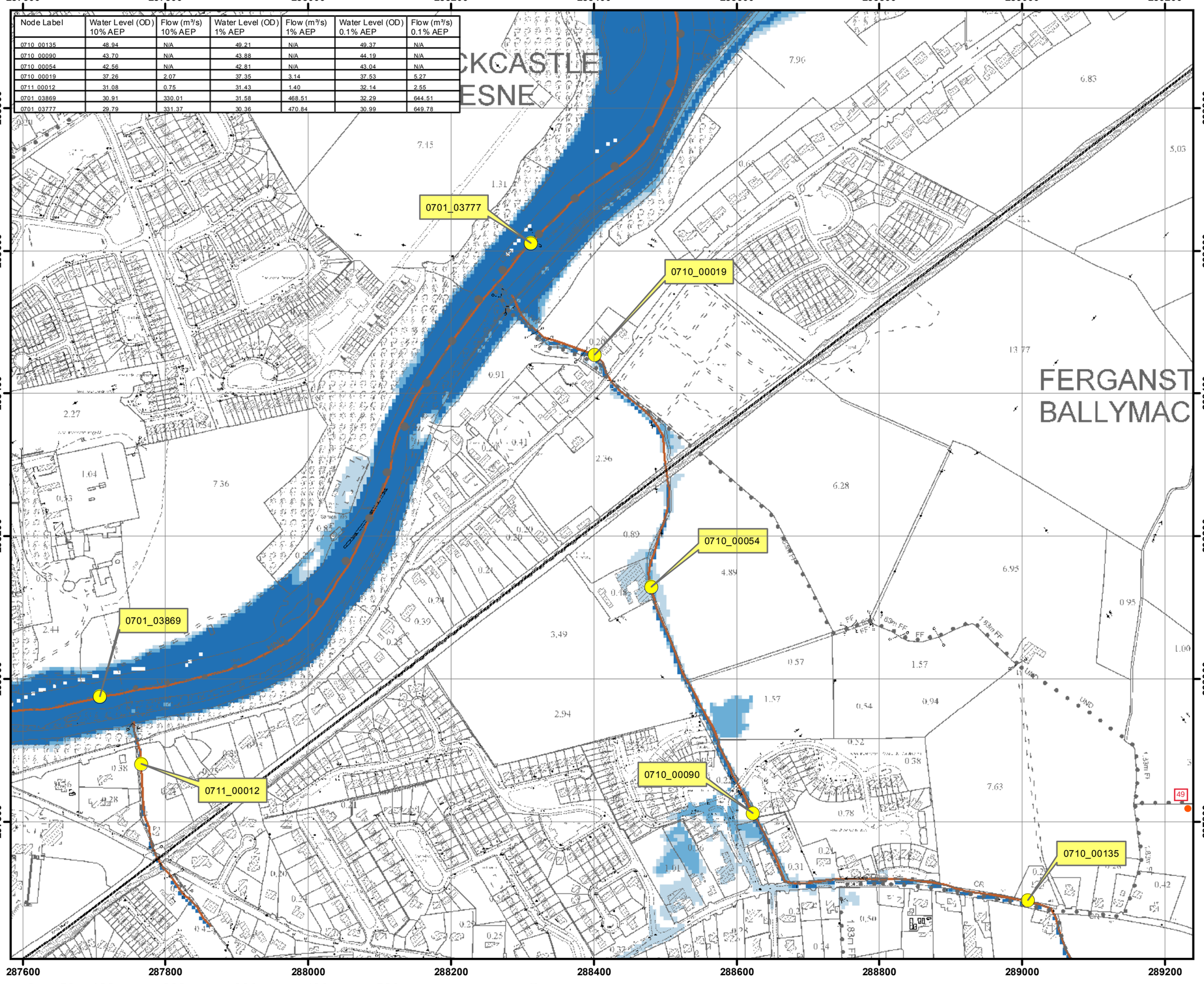
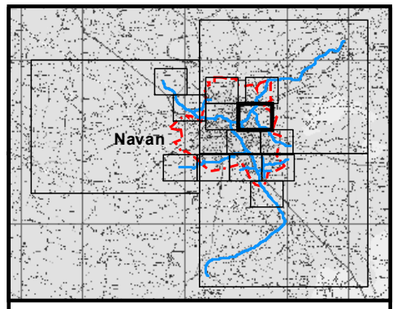
Map: Navan Fluvial Flood Extents

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_14
Map Series : Page 14 of 16
Drawing Scale : 1:5,000 @A3

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
0710_00135	48.94	N/A	49.21	N/A	49.37	N/A
0710_00090	43.70	N/A	43.88	N/A	44.19	N/A
0710_00054	42.56	N/A	42.81	N/A	43.04	N/A
0710_00019	37.26	2.07	37.35	3.14	37.53	5.27
0711_00012	31.08	0.75	31.43	1.40	32.14	2.55
0701_03869	30.91	330.01	31.58	468.51	32.29	644.51
0701_03777	29.79	331.37	30.36	470.84	30.99	649.78





IMPORTANT USER NOTE:
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Legend

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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_15
Map Series :	Page 15 of 16
Drawing Scale :	1:5,000 @ A3

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CONSULTANTS IN ENGINEERING,
ENVIRONMENTAL SCIENCE
& PLANNING

APPENDIX 4

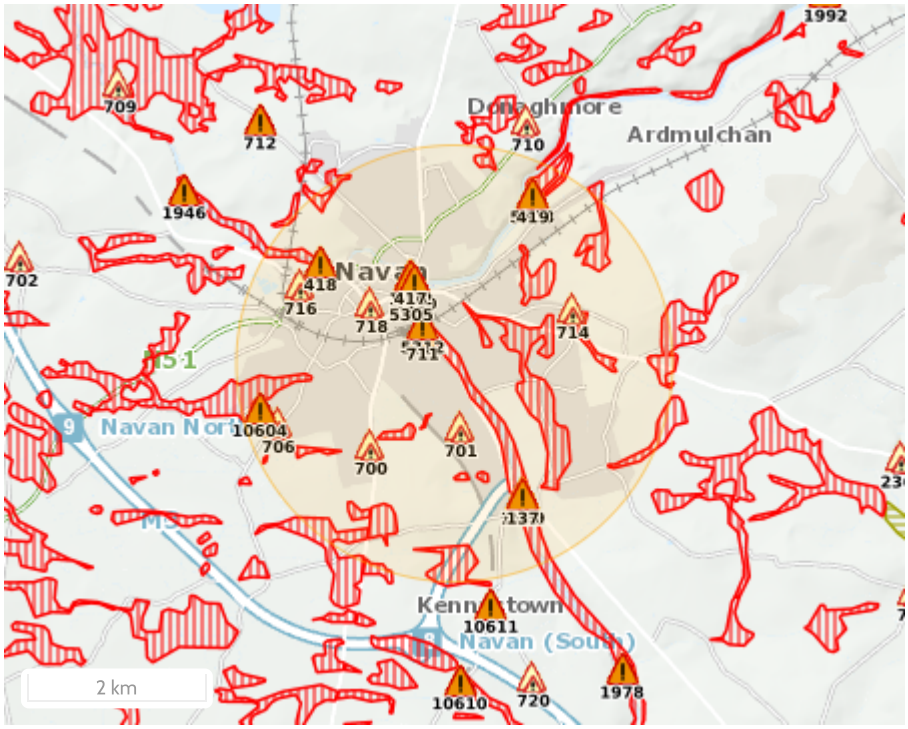
Past Flood Event Local Area Summary Reports

Past Flood Event Local Area Summary Report

OPW Oifig na nOibreacha Poiblí Office of Public Works

Report Produced: **6/1/2022 14:40**

This Past Flood Event Summary Report summarises all past flood events within 2.5 kilometres of the map centre.



Map Legend

- Single Flood Event
- Recurring Flood Event
- Past Flood Event Extents
- Drainage Districts Benefited Lands*
- Land Commission Benefited Lands*
- Arterial Drainage Schemes Benefited Lands*

* Important: These maps do not indicate flood hazard or flood extent. Their purpose and scope is explained on Floodinfo.ie

22 Results

	Name (Flood_ID)	Start Date	Event Location
1.	Navan Swan Culvert, Trim Road Recurring (ID-700)	n/a	Approximate Point
	Additional Information: Reports (2) Press Archive (0)		
2.	Boyne Navan Dec 1978 (ID-137)	27/12/1978	Approximate Point
	Additional Information: Reports (1) Press Archive (2)		
3.	Boyne Kilcarn Dec 1968 Jan 1969 (ID-215)	01/12/1968	Approximate Point
	Additional Information: Reports (1) Press Archive (0)		
4.	Boyne Navan Nov 2000 (ID-417)	06/11/2000	Approximate Point
	Additional Information: Reports (9) Press Archive (3)		
5.	Blackwater Navan Nov 2000 (ID-418)	07/11/2000	Approximate Point
	Additional Information: Reports (4) Press Archive (1)		
6.	Boyne Navan Feb 1990 (ID-419)	07/02/1990	Approximate Point
	Additional Information: Reports (1) Press Archive (1)		

	Name (Flood_ID)	Start Date	Event Location
7.	Boyne Navan Nov 2002 (ID-420) **Additional Information:** Reports (1) Press Archive (0)	15/11/2002	Approximate Point
8.	Swan Kilcarn Housing Estate Navan Recurring (ID-701) **Additional Information:** Reports (3) Press Archive (0)	n/a	Approximate Point
9.	Navan Commons Road Recurring (ID-706) **Additional Information:** Reports (2) Press Archive (0)	n/a	Approximate Point
10.	Boyne Academy Street, Navan 1991 (ID-711) **Additional Information:** Reports (2) Press Archive (0)	01/01/1991	Approximate Point
11.	Boyne Navan Kilcarn Bridge Recurring (ID-713) **Additional Information:** Reports (5) Press Archive (0)	n/a	Approximate Point
12.	Navan Atlumney Recurring (ID-714) **Additional Information:** Reports (3) Press Archive (0)	n/a	Approximate Point
13.	Moatville Housing Estate Navan Recurring (ID-716) **Additional Information:** Reports (2) Press Archive (1)	n/a	Approximate Point
14.	Raish Court Navan Recurring (ID-718) **Additional Information:** Reports (2) Press Archive (0)	n/a	Approximate Point
15.	Boyne Kilcarn Bridge Navan Nov 2000 (ID-1979) **Additional Information:** Reports (3) Press Archive (0)	05/11/2000	Approximate Point
16.	Boyne Navan Nov 1965 (ID-1982) **Additional Information:** Reports (1) Press Archive (0)	17/11/1965	Approximate Point
17.	Boyne Athlumney Nov 2002 (ID-5305) **Additional Information:** Reports (1) Press Archive (0)	14/11/2002	Approximate Point
18.	Boyne Blackcastle Nov 2002 (ID-5308) **Additional Information:** Reports (1) Press Archive (0)	14/11/2002	Approximate Point
19.	Boyne Blackwater Nov 2002 (ID-5309) **Additional Information:** Reports (1) Press Archive (0)	14/11/2002	Approximate Point
20.	Boyne Kilcarn Nov 2002 (ID-5311) **Additional Information:** Reports (1) Press Archive (0)	14/11/2002	Approximate Point
21.	Boyne Railway Bridge, Navan Nov 2002 (ID-5312) **Additional Information:** Reports (1) Press Archive (0)	14/11/2002	Approximate Point
22.	Boyne Commons Lane Navan August 2008 (ID-10604) **Additional Information:** Reports (1) Press Archive (0)	16/08/2008	Approximate Point

Past Flood Event Local Area Summary Report

Report Produced: **6/1/2022 14:42**

This Past Flood Event Summary Report summarises all past flood events within 2.5 kilometres of the map centre.

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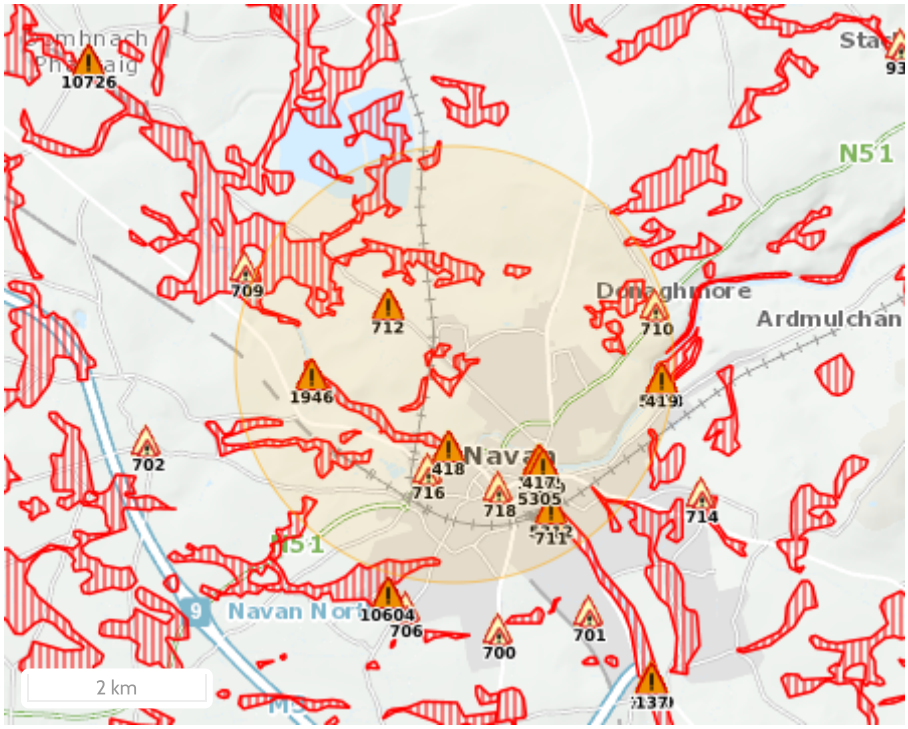

Map Legend

- Single Flood Event
- Recurring Flood Event
- Past Flood Event Extents
- Drainage Districts Benefited Lands*
- Land Commission Benefited Lands*
- Arterial Drainage Schemes Benefited Lands*

* Important: These maps do not indicate flood hazard or flood extent. Their purpose and scope is explained on Floodinfo.ie

15 Results

	Name (Flood_ID)	Start Date	Event Location
1.	Donaghmore at Round Tower Recurring (ID-710)	n/a	Approximate Point
	Additional Information: Reports (2) Press Archive (0)		
2.	Windtown Navan Nov 2000 (ID-712)	06/11/2000	Approximate Point
	Additional Information: Reports (2) Press Archive (0)		
3.	Boyne Navan Nov 2000 (ID-417)	06/11/2000	Approximate Point
	Additional Information: Reports (9) Press Archive (3)		
4.	Blackwater Navan Nov 2000 (ID-418)	07/11/2000	Approximate Point
	Additional Information: Reports (4) Press Archive (1)		
5.	Boyne Navan Feb 1990 (ID-419)	07/02/1990	Approximate Point
	Additional Information: Reports (1) Press Archive (1)		
6.	Boyne Navan Nov 2002 (ID-420)	15/11/2002	Approximate Point
	Additional Information: Reports (1) Press Archive (0)		

	Name (Flood_ID)	Start Date	Event Location
7.	Boyne Academy Street, Navan 1991 (ID-711)	01/01/1991	Approximate Point
	Additional Information: Reports (2) Press Archive (0)		
8.	Moatville Housing Estate Navan Recurring (ID-716)	n/a	Approximate Point
	Additional Information: Reports (2) Press Archive (1)		
9.	Raish Court Navan Recurring (ID-718)	n/a	Approximate Point
	Additional Information: Reports (2) Press Archive (0)		
10.	Blackwater Liscarton Dec 1978 (ID-1946)	27/12/1978	Approximate Point
	Additional Information: Reports (1) Press Archive (3)		
11.	Boyne Navan Nov 1965 (ID-1982)	17/11/1965	Approximate Point
	Additional Information: Reports (1) Press Archive (0)		
12.	Boyne Athlumney Nov 2002 (ID-5305)	14/11/2002	Approximate Point
	Additional Information: Reports (1) Press Archive (0)		
13.	Boyne Blackcastle Nov 2002 (ID-5308)	14/11/2002	Approximate Point
	Additional Information: Reports (1) Press Archive (0)		
14.	Boyne Blackwater Nov 2002 (ID-5309)	14/11/2002	Approximate Point
	Additional Information: Reports (1) Press Archive (0)		
15.	Boyne Railway Bridge, Navan Nov 2002 (ID-5312)	14/11/2002	Approximate Point
	Additional Information: Reports (1) Press Archive (0)		

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