Comhairle Contae
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South Dublin County Council

South Dublin County Council
Development Plan
2016 – 2022

A VISION FOR SOUTH DUBLIN'S FUTURE

Proposed Variation No. 1

Zoning Objective Amendment on Lands at Grangecastle West

Strategic Flood Risk Assessment Report

February 2018

Clifton Scannell Emerson Associates Limited,
Consulting Engineers, Seafort Lodge, Castledawson Avenue, Blackrock, Co. Dublin, Ireland.
T. +353 1 2885006 F. +353 1 2833466 E. info@csea.ie W. www.csea.ie

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Table of Contents

1 Introduction

1.1 Background

On behalf of South Dublin County Council (SDCC), Clifton Scannell Emerson Associates (CSEA) were tasked with the undertaking of a Strategic Flood Risk Assessment (SFRA) study for the lands proposed as part of the variation to be rezoned, located to the west of Grange Castle Business Park in Dublin 22.

The SFRA is carried out in full compliance with the requirements of "The Planning System & Flood Management Guidelines" published by the Department of Environment in November 2009.

1.2 Site Location

The proposed lands are located to the West of Grange Castle and Grange Castle South Business Parks, South of the Grand Canal and continues out to the west where it stops at an arbitrary location along a future North/South link Road. The footprint of the 193 hectare footprint takes in large portions of existing lands attributed to Brownstown, Loughtown upper and lower, Milltown, Clutterland and Peamount. The R120 Regional Road (to be upgraded 2017/2018) traverses the eastern boundary of the existing 193 hectare plot. For further details, please see drawing 17_129_00_1009 located in **Appendix A** of this report.

The proposed lands are situated in close proximity to the N7 motorway and Junction which provides access to the west and south west of Ireland. The N7 Junction additionally offers vital connectivity to the M50 Orbital Motorway which is the main gateway to the North and South of Ireland. The M50 Orbital Motorway circles the northern, southern and western suburbs of Dublin City and provides access to significant infrastructure such as the Port Tunnel, Dublin Port, and Dublin International Airport. The area associated with these proposed lands is connected to the national road network by its proximity to various arterial routes; within 6km of the M50 (Dublin orbital route), 3km of the N7/M7 (South and South West) and 6km of the M4 (West and North West).

1.3 Site Description

As discussed in chapter 1.2 of this report, the footprint of the proposed 193 hectares lands falls within large portions of existing lands attributed to Brownstown, Loughtown upper and lower, Milltown, Clutterland and Peamount respectively. The site is located to the West of the existing Grange Castle and Grange Castle South Business Parks. The sites northern boundary straddles the southern tow path of the Grand Canal and continues out to the west where it stops short approximately 450m from the County Dublin/Kildare County boundary line. For further information, please see **Figure 1** below which displays all the townland boundaries that are located within the proposed lands boundary.

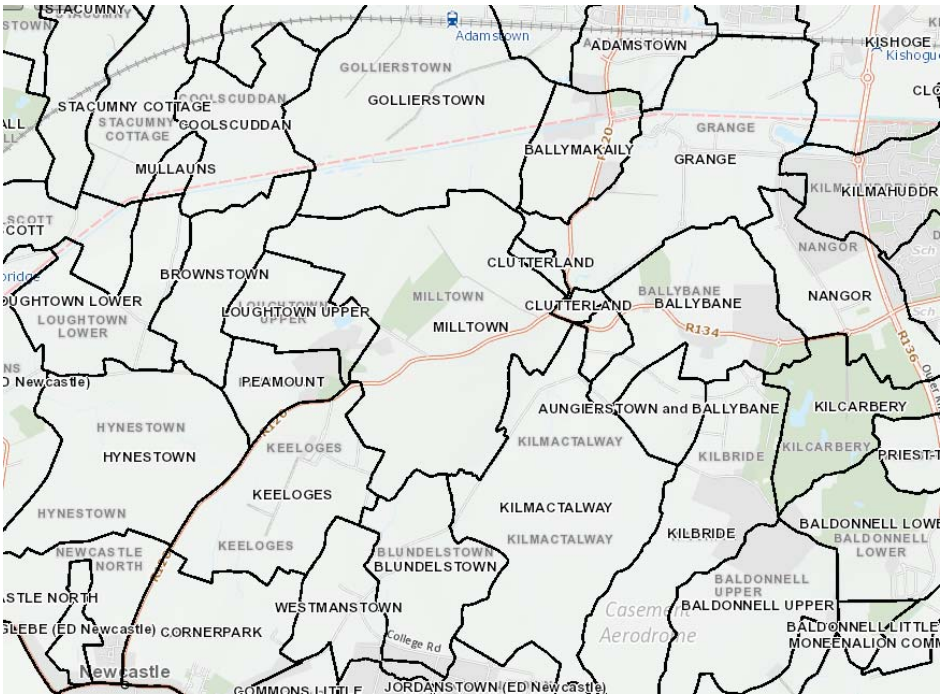


Figure 1 - Existing Townland Boundaries (GSI Website)

Located to south and centrally to the proposed lands southern boundary line is Peamount reservoir and Peamount Hospital. Irish Water have proposed that the Shannon to Dublin Water Scheme will land adjacent to the existing Peamount reservoir where an extension to this existing reservoir facility is proposed.

The general topography of the site falls from Peamount reservoir and Hospital located south and central to the proposed lands southern boundary and is considered the highest point of the site set at 80m above Malin Head Irish Grid reference system. From this location, the site gradually falls in a northerly, north westerly and north easterly direction towards the Grand Canal with a small portion falling in a south westerly direction.

The overall level difference between the highest (Peamount Reservoir surrounding lands) and lowest point attributed to the furthest north westerly point of the proposed lands site is 12m over a length of approximately 1065m. The overall level difference between the highest (Peamount Reservoir surrounding lands) and lowest point attributed to the furthest northern point of the site is 4m over a

length of approximately 690m. Finally, the overall level difference between the highest (Peamount Reservoir surrounding lands) and lowest point attributed to the furthest north easterly point of the site is 13m over a length of approximately 1500m. A section of the proposed lands, as discussed above, falls in a south westerly direction located within the existing Peamount lands where the overall level difference is 5m over a length of approximately 870m.

The current use for the existing lands is functioning predominately as both arable and pastoral farming.

The northern boundary of the proposed lands skirts an existing Biodiversity area attributed to the Grand Canal which contains pockets of water pools which are identified and referenced as the 'Tobermaclugg abandoned quarry'.

Located centrally with the proposed lands is an existing foul macerator which facilitates all of Peamount Hospital and its surrounding lands foul sewer requirements. From here, the foul effluent is discharged through a series of foul sewer pipework and chambers that traverse through the proposed lands in a north easterly direction where it then crosses under the existing Grand Canal and existing Dublin to Cork Railway line before connecting into an existing foul network located within Castlegate Park adjacent to the R120 Regional Road.

Located to the east of the proposed lands footprint and contained within the existing Clutterland lands is an existing Traveller Accommodation Site where access to this site is gained off the existing R120 Regional Road which is due to be upgraded in the near future.

Located to the south of the existing Traveller Accommodation site is an existing SDCC owned water tower. This existing water tower is redundant.

There are existing 10kV ESB overhead power lines including and series of supporting masts that run in a north south direction on the western side of the site through the Milltown lands attributed to the proposed lands site. Additionally, there are existing 10kV ESB Overhead lines and supporting masts that run in an east to west and north to south direction that ultimately cuts through the most eastern and south easterly portion of the proposed lands site located south of the existing Traveller Accommodation site. The existing overhead lines (east west lines) continue in an east to west direction before skirting around the proposed lands southern boundary and around the existing western side of the existing Peamount Reservoir site. From here it continues in an east west direction dissecting through the most southern portion of the proposed lands located within the existing Peamount townlands lands.

Contained within the existing Milltown lands attributed to the proposed lands site is an existing spring located just north east off the existing Peamount reservoir site. Groundwater surging up through this spring has been deemed as the commencement of the Tobermaclugg stream.

Located further south east of the proposed lands site is Baldonnel Airbase (Casement Air Base) which enforces a 20m new building height restriction zone that may only effect a very minor portion of the furthest south eastern corner of the proposed lands site that is located adjacent to the existing Nangor Road/R120 junction. Located approximately 3Km directly north of the proposed lands is Weston Airport.

2 The Planning System and Flood Risk Management Guidelines

2.1 Introduction

In 2009 the Department of Environment, Heritage and Local Government in conjunction with the Office of Public Works published The Planning System and Flood Risk Management: Guidelines for Planning Authorities. The purpose of the Guidelines is to ensure that flood risk is considered by all levels of government when preparing development plans and planning guidelines. They should also be used by developers when addressing flood risk in development proposals. The Guidelines should be implemented in conjunction with the relevant flooding and water quality EU Directives including the Water Framework Directive (River Basin Management Plans (RBMPs)) and the Floods Directive (Catchment Flood Risk Assessment and Management Studies (CFRAMS)).

The core objectives of the Guidelines are to:

- Avoid inappropriate development in areas at risk of flooding.
- Avoid new developments increasing flood risk elsewhere, including that which may arise from surface water run-off.
- Ensure effective management of residual risks for development permitted in floodplains.
- Avoid unnecessary restriction of national, regional or local economic and social growth.
- Improve the understanding of flood risk among relevant stakeholders; and
- Ensure that the requirements of EU and national law in relation to the natural environment and nature conservation are complied with at all stages of flood risk management.

The Guidelines recommend that Flood Risk Assessments (FRA) be carried out to identify the risk of flooding to land, property and people. FRAs should be carried out at different scales by government organisations, local authorities and for proposed developments appropriate to the level of information required to implement the core objectives of the Guidelines. The FRA scales are:

- **Regional Flood Risk Appraisal (RFRA)** - a broad overview of flood risk issues across a region to influence spatial allocations for growth in housing and employment as well as to identify where flood risk management measures may be required at a regional level to support the proposed growth. Currently being undertaken by the OPW through the CFRAMs process.
- **Strategic Flood Risk Assessment (SFRA)** - an assessment of all types of flood risk informing land use planning decisions. This will enable the Planning Authority to allocate appropriate sites for development, whilst identifying opportunities for reducing flood risk. This SFRA will revisit and develop the flood risk identification undertaken in the RFRA, and give consideration to a range of potential sources of flooding. An initial flood risk assessment, based on the identification of Flood Zones, will also be carried out for those areas, which will be zoned for development. Where the initial flood risk assessment highlights the potential for a significant level of flood risk, or there is conflict with the proposed vulnerability of development, then a site specific FRA will be recommended, which will necessitate a detailed flood risk assessment.
- **Site Specific Flood Risk Assessment (FRA)** - site or project specific flood risk assessment to consider all types of flood risk associated with the site and propose appropriate site management and mitigation measures to reduce flood risk to and from.

2.2 Flood Risk Assessment Approach

The Guidelines recommend that Flood Risk Assessments (FRA) be carried out to identify the risk of flooding to land, property and people. FRAs should use the Source-Pathway-Receptor (S-P-R) Model to identify the sources of flooding, the flow paths of the floodwaters and the people and assets impacted by the flooding. **Figure 2** shows the SPR model that should be adopted in FRAs.

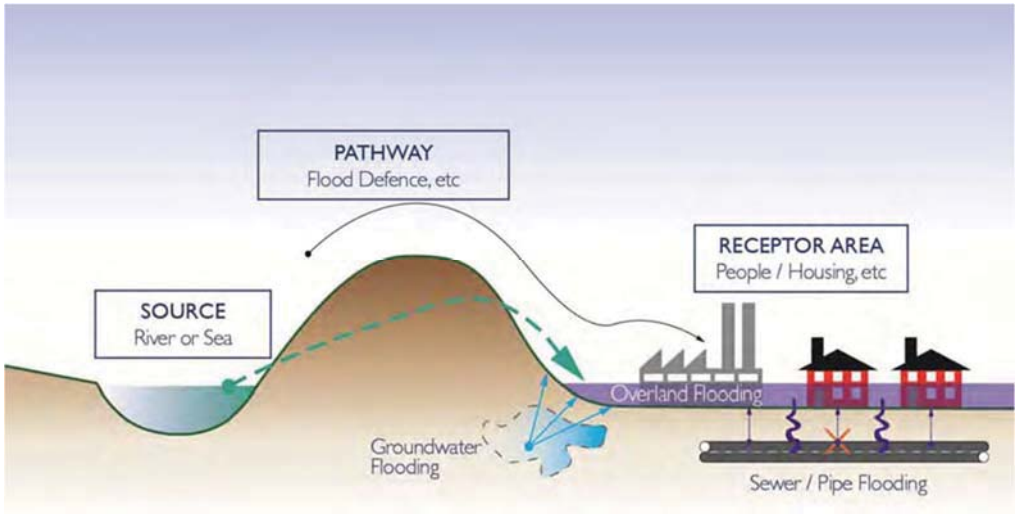


Figure 2 - Flood Risk Assessment Source - Pathway - Receptor Model (SFRA-SDCC Dev. Plan 2016 - 2022)

FRAs should be carried out using the following staged approach;

- **Stage 1 Flood Risk Identification** - to identify whether there may be any flooding or surface water management issues related to either the area of regional planning guidelines, development plans and LAP's or a proposed development site that may warrant further investigation at the appropriate lower level plan or planning application levels.

- **Stage 2 Initial Flood Risk Assessment** - to confirm sources of flooding that may affect a plan area or proposed development site, to appraise the adequacy of existing information and to scope the extent of the risk of flooding which may involve preparing indicative flood zone maps. Where hydraulic models exist the potential impact of a development on flooding elsewhere and of the scope of possible mitigation measures can be assessed. In addition, the requirements of the detailed assessment should be scoped.

- **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 or land to be zoned, of its potential impact on flood risk elsewhere and of the effectiveness of any proposed mitigation measures.

This report addresses the requirements for both stages 1 and 2 respectively.

2.3 Types of Flooding

There are two main sources of flooding, inland and coastal. Inland flooding is caused by prolonged and/or intense rainfall. This results in fluvial, pluvial or ground water flooding acting independently or in combination. Coastal flooding is not a concern for SDCC as it is a landlocked county, however a combination of high flow in rivers and a high tide may prevent the river from discharging into the sea thus increasing water levels inland causing rivers to overtop their banks.

- Fluvial flooding occurs when a river overtops its banks due to a blockage in the channel or the channel capacity is exceeded.
- Pluvial flooding occurs when overland flow cannot infiltrate into the ground, when drainage systems exceed their capacity or are blocked and when the water cannot discharge due to a high water level in the receiving watercourse.
- Groundwater flooding occurs when the level of water stored in the ground rises as a result of prolonged rainfall to meet the ground surface and flows out over it.

2.4 Flood Risk

Guidelines state flood risk is a combination of the likelihood of flooding and the potential consequences arising. Flood risk is expressed as:

Flood risk = Likelihood of flooding x Consequences of flooding

The Guidelines define the likelihood of flooding as the percentage probability of a flood of a given magnitude as occurring or being exceeded in any given year. A 1% probability indicates the severity of a flood that is expected to be exceeded on average once in 100 years, i.e. it has a 1 in 100 (1%) chance of occurring in any one year. **Table 1.0** shows flood event probabilities used in flood risk management.

Annual Exceedance Probability (%)	Return Period (Years)
50	2
10	10
1	100
0.1	1000

Table 1.0 - Flood Event Probabilities

The consequences of flooding depend on the hazards associated with the flooding (e.g. depth of water, speed of flow, rate of onset, duration, wave action effects, water quality), and the vulnerability of people, property and the environment potentially affected by a flood (e.g. the age profile of the population, the type of development, presence and reliability of mitigation measures etc.).

2.5 Flood Zones

The Guidelines recommend identifying flood zones which show the extent of flooding for a range flood event probabilities. The Guidelines identify three levels of flood zones:

- **Flood Zone A** - where the probability of flooding from rivers and the sea is highest (greater than 1% or 1 in 100 for river flooding or 0.5% or 1 in 200 for coastal flooding).
- **Flood Zone B** - where the probability of flooding from rivers and the sea is moderate (between 0.1% or 1 in 1000 and 1% or 1 in 100 for river 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 from rivers and the sea is low (less than 0.1% or 1 in 1000 for both river and coastal flooding). Flood Zone C covers all areas of the plan which are not in zones A or B.

The flood zones are generated without the inclusion of climate change factors. The flood zones only account for inland and coastal flooding. They should not be used to suggest that any areas are free from flood risk as they do not account for potential flooding from pluvial and groundwater flooding. Similarly, flood defences should be ignored in determining flood zones as defended areas still carry a residual risk of flooding from overtopping, failure of the defences and deterioration due to lack of maintenance.

2.6 Climate Change

Climate Change is expected to increase flood risk. It could lead to more frequent flooding and increase the depth and extent of flooding. Due to the uncertainty surrounding the potential effects of climate change a precautionary approach is recommended in the Guidelines:

- Recognise that significant changes in the flood extent may result from an increase in rainfall or tide events and accordingly adopt a cautious approach to zoning land in these potential transitional areas.
- Ensure that the levels of structures designed to protect against flooding, such as flood defences, land-raising or raised floor levels are sufficient to cope with the effects of climate change over the lifetime of the development they are designed to protect.
- Ensure that structures to protect against flooding and the development protected are capable of adaptation to the effects of climate change when there is more certainty about the effects and still time for such adaptation to be effective.

2.7 Sequential Approach

The Guidelines recommend using a sequential approach to planning to ensure the core objectives are implemented. Development should be avoided in areas at risk of flooding, where this is not possible, a land use that is less vulnerable to flooding should be considered. If the proposed land use cannot be avoided or substituted a Justification Test must be applied and appropriate sustainable flood risk management proposals should be incorporated into the development proposal. **Figure 2** shows the sequential approach principles in flood risk management. **Table 2.0 and Table 3.0** outline recommendations from the Guidelines for the types of development that would be appropriate to each flood zone and those that would be required to meet the Justification Test.

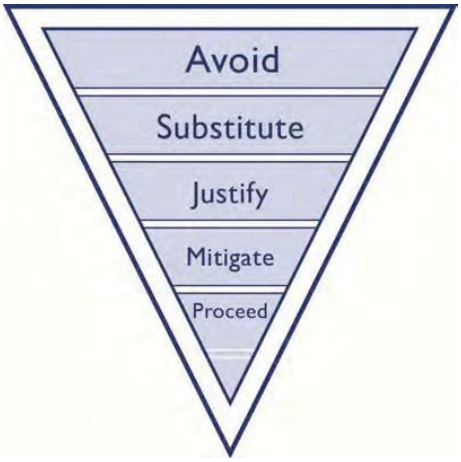


Figure 2 - Sequential Approach Principles in Flood Risk Management

	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

Table 2.0 - Matrix of vulnerability versus flood zone to illustrate appropriate development and that required to meet the Justification Test.

The Justification Test is used to assess the appropriateness of developments in flood risk areas. The test is comprised of two processes. The first is the Plan-making Justification Test and 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 and 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.

Vulnerability Class	Land uses and types of development which include*:
Highly vulnerable development (including essential infrastructure)	• Garda, ambulance and 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; and • 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; and • Local transport infrastructure.
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; and • Essential ancillary sleeping or residential accommodation for staff required by uses in this category (subject to a specific warning and evacuation plan).
*Uses not listed here should be considered on their own merit	

Table 3.0 - Classification of vulnerability of different types of development

3 Flood Risk Identification

3.1 Flood Risk Identification

The proposed lands are located to the West of Grange Castle and Grange Castle South Business Parks, South of the Grand Canal and continues out to the west where it stops at an arbitrary location along a future North/South link Road. The footprint of the existing footprint takes in large portions of existing lands attributed to Brownstown, Loughtown upper and lower, Milltown, Clutterland and Peamount. The R120 Regional Road (to be upgraded 2017/2018) traverses the eastern boundary of the potential 193 hectares land bank.

The general topography of the site falls from Peamount reservoir and Hospital located south and central to the proposed lands southern boundary and is considered the highest point of the site set at 80m above Malin Head Irish Grid reference system. From this location, the site gradually falls in a northerly, north westerly and north easterly direction towards the Grand Canal with a small portion falling in a south westerly direction.

The overall level difference between the highest (Peamount Reservoir surrounding lands) and lowest point attributed to the furthest north westerly point of the proposed lands site is 12m over a length of approximately 1065m. The overall level difference between the highest (Peamount Reservoir surrounding lands) and lowest point attributed to the furthest northern point of the site is 4m over a length of approximately 690m. Finally, the overall level difference between the highest (Peamount Reservoir surrounding lands) and lowest point attributed to the furthest north easterly point of the site is 13m over a length of approximately 1500m. A section of the proposed lands, as discussed above, falls in a south westerly direction located within the existing Peamount lands where the overall level difference is 5m over a length of approximately 870m.

The current use for the proposed lands is functioning predominately as both arable and pastoral farming.

3.2 Hydrology of the Surrounding Area

Contained within the existing Milltown lands attributed to the proposed lands is an existing spring located just north east of the existing Peamount reservoir site. Groundwater surging up through this spring has been identified as the commencement of the Tobermaclugg stream. This stream then continues in a northerly direction towards the Grand Canal and the Cork to Dublin Railway line.

Contained within Grange Castle Business Park is the Griffeen River which was diverted from its natural course in 2004/2005 to ultimately maximise site plots within the Business Park and to provide for necessary flood capacity alleviation works. The Griffeen River is located approximately 200m to the south eastern corner of the proposed lands site at its closest point. No diversionary works are required to facilitate the existing Griffeen River with respect to the proposed lands.

Located approximately 2km from the western boundary of the proposed lands site is the Shinkeen stream. Upon review it has been concluded that the Shinkeen Stream poses no direct threat with regards to fluvial flooding as the footprint of the stream channel is deemed to not be in close proximity to the proposed lands site. For further details with regards to the location of each of the aforementioned streams/rivers, please see **Figure 3** below which has been extracted from Environmental Protection Agency (EPA) Map Viewer website.

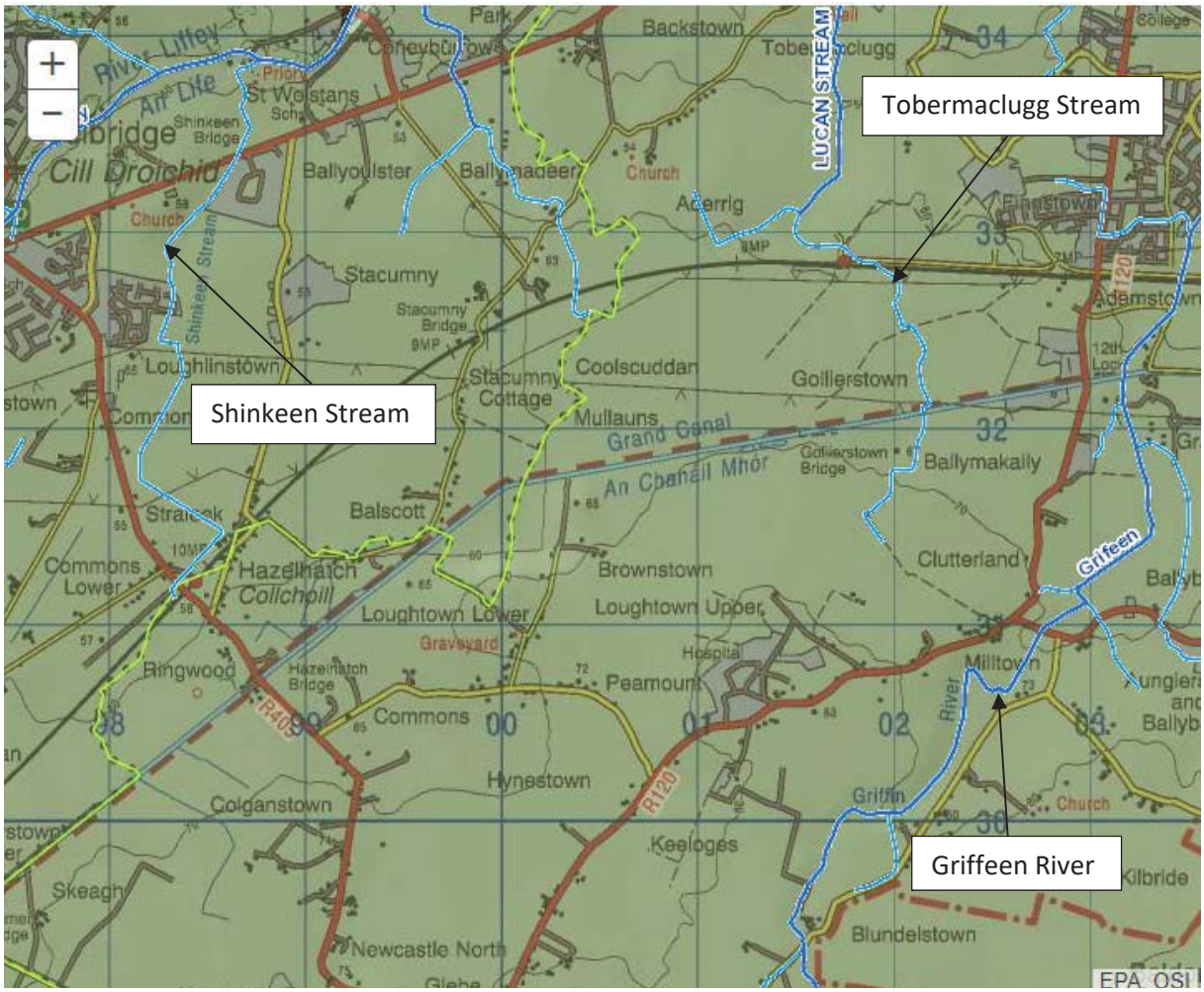


Figure 3 - of Existing watercourses that fall within footprint and in close proximity of the proposed lands (EPA Map Viewer)

3.3 OPW Flood Maps

The examination of recorded flood events as detailed on OPW's www.floodmaps.ie interactive mapping website displays two recorded flood events which occurred at Peamount R134/R120 Junction (Nov 2004) and Peamount Road (April 2005). As previously mentioned, the proposed Nangor Road/R120 Realignment project is imminent. This project encompasses the construction of the new R120/Nangor Road Junction which will ultimately negate any of the historic flooding issues identified in the OPW interactive flood mapping discussed and identified above in relation to the November 2004 flood event.

With regards to the Peamount Road flood event (April 2005), this was deemed to be insignificant as it is not considered to be in close proximity of the proposed lands. For further details, please see **Figure 4** displayed below. Furthermore, please find reports/meeting minutes attributed to the two identified flooding events located in **Appendix B** of this report.

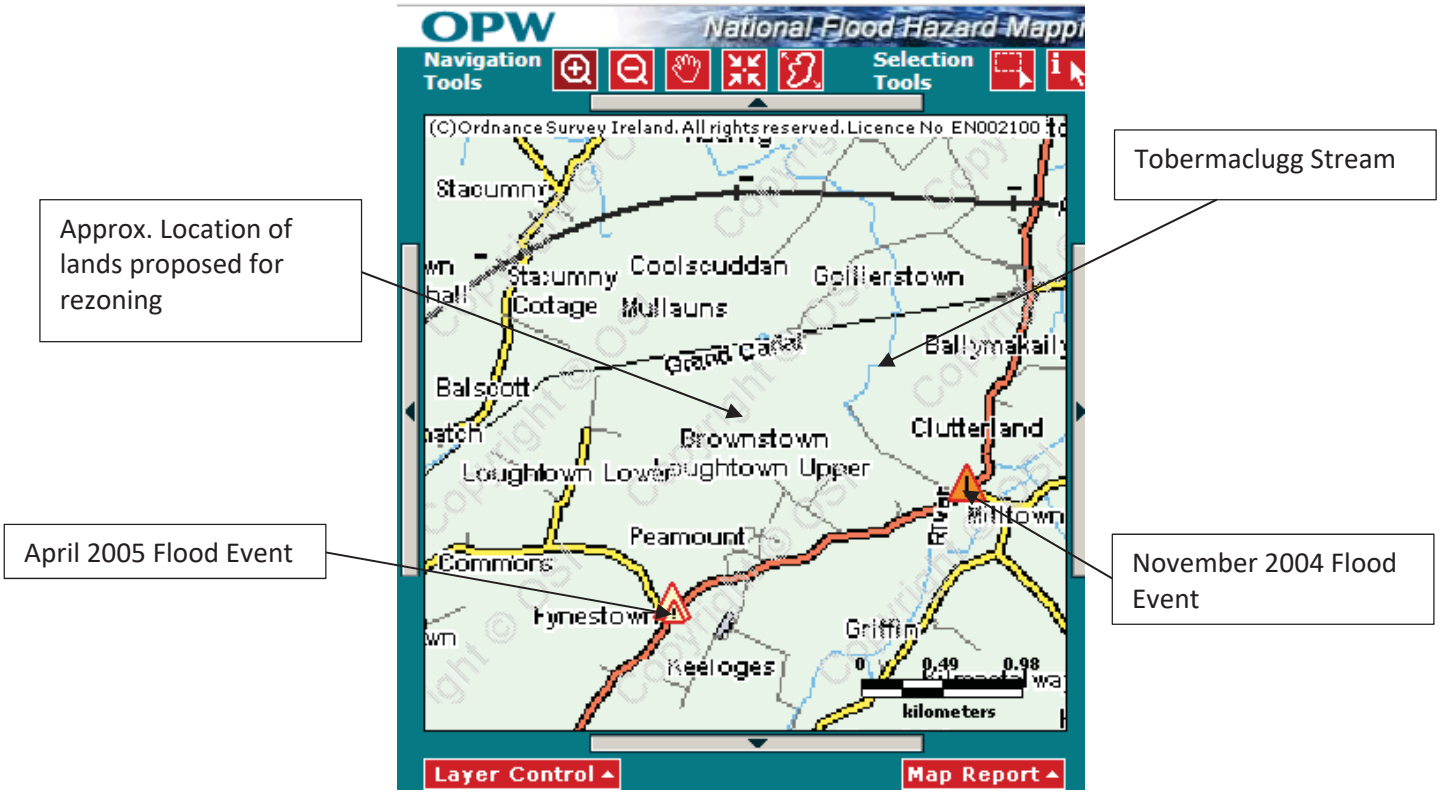


Figure 4 - National Flood Hazard Mapping (OPW)

3.4 Geology, Water and Hydrology

Geological and Hydrological Information obtained from the Geological Survey of Ireland (GSI) are attached in **Appendix C** of this report.

The GSI Bedrock 100K Solid Geology for the proposed lands is found to be Lucan Formation (Dark Limestone & Shale - Formation ranges from 300m to 800m in Thickness).

The National Draft Bedrock Aquifer identified within the proposed lands footprint has been described as a 'Locally Important Aquifer - Bedrock which is moderately productive only in local zones.

The geological society of Ireland (GSI) maintain a database of ground investigation works undertaken and keep records of borehole and trial pit data. It was found that no boreholes or trial pit testing have been undertaken to date within the proposed lands.

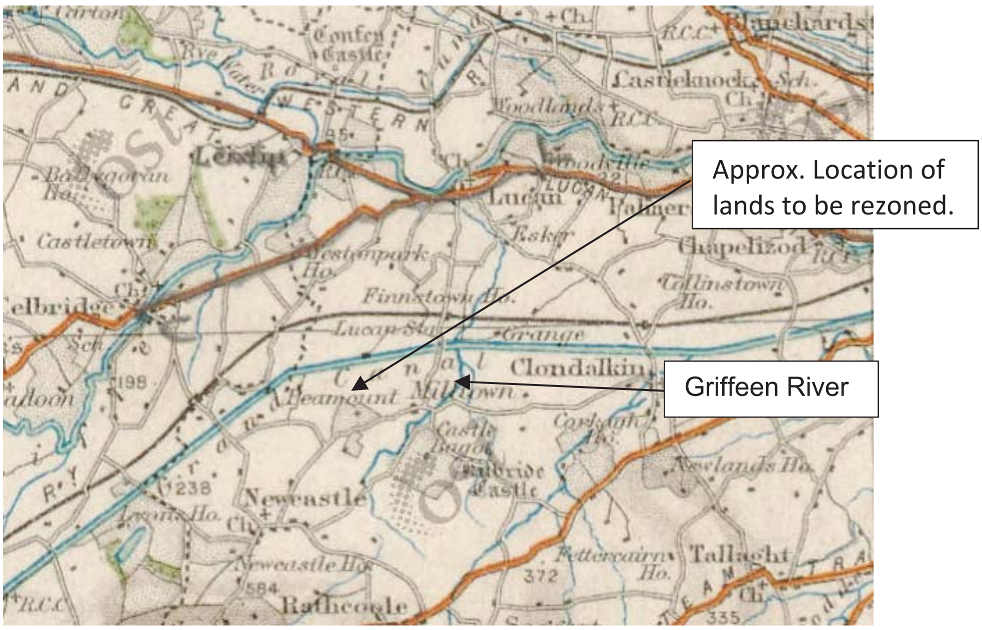
As deemed necessary, a full Ground Investigation contract should be procured in the future to establish existing ground conditions attributed to the proposed lands.

3.5 Hydrometric Gauging Stations

CSEA have reviewed the hydrometric information available from the OPW/EPA in proximity to the proposed lands site. It has been determined that there was no data available that would have been of any major benefit to this study.

3.6 OSI Historical Mapping

The 6" (1837 – 1842) and the 25" (1888 – 1913) historical maps have been examined (See Figures 4 and 5). Historical mapping is often a very useful source of information for assessing the flood history of an area. The historical maps examined include the 'Griffeen River' which was diverted from its natural course in 2004/2005 to ultimately maximise site plots within Grange Castle Business Park and to provide for necessary flood capacity alleviation works. There is no indication of historical flooding upon review of both (**Figures 5** & **6** below) OSI Historical Maps.



<u>**Figure 5** - 25" Historical Mapping (Myplan.ie)</u>

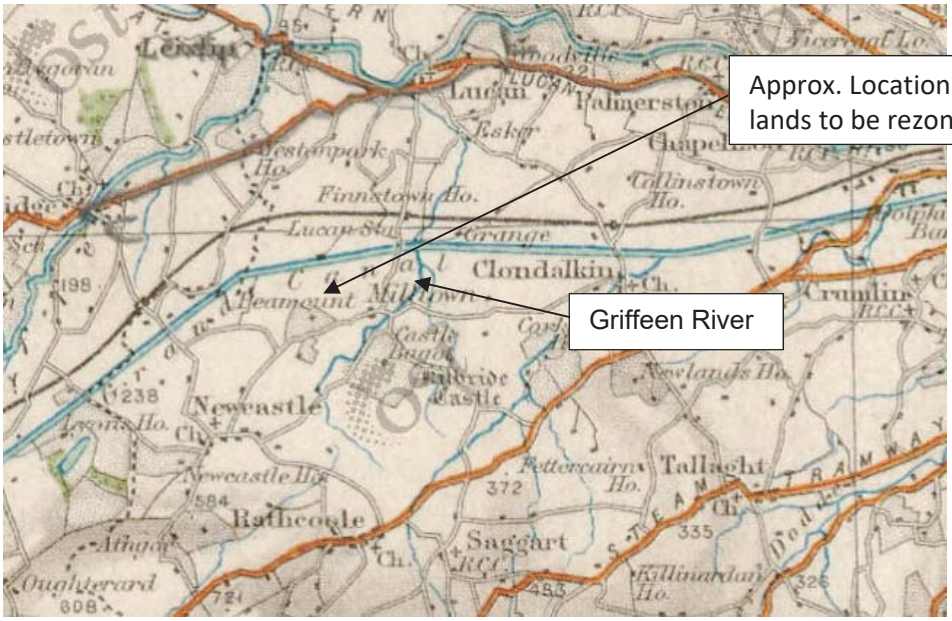


Figure 6 - 6" Historical Mapping (Myplan.ie)

3.7 Walkover Survey

On the 10th August 2017 Clifton Scannell Emerson Associates visited the proposed lands site to establish any potential sources of flooding, likely routes of flood waters and the sites key features. The following items was established on site:

- The site gradually falls in a northerly, north westerly and north easterly direction towards the Grand Canal with a small portion falling in a south westerly direction.
- Crops in proposed lands had not yet been harvested.
- Dry weather conditions experienced during site walkover.
- The commencement location of the Tobermaclugg stream (spring) was not fully identified during site visit. This may have been due to dry weather conditions experienced during months of July & August 2017.
- Existing drainage ditches located along farmland boundaries in the vicinity of the Tobermaclugg stream were deemed to be both dry and maintained to a reasonable standard.
- The Tobermaclugg stream crossing location at the Grand Canal not fully identified on site.

3.8 Initial Estimates of Flood Zone and Flood Risk

3.8.1 Indicative Flood Zone Maps

As discussed previously, It has been determined that the Tobermaclugg stream is located within the footprint of the proposed lands. An extract of the fluvial flood extent maps from the 'Lucan to Chapelizod' Area is shown in Figure 6, the full map can be seen in **Appendix D** of this report. Upon inspection of the fluvial 'Lucan to Chapelizod' flood extent map, it is suggested that the Tobermaclugg stream is not susceptible to flooding for the 10% (1 in 10), 1% (1 in 100) or 0.1% (1 in 1000) fluvial AEP events. With regards to the node ID labels displayed in **Figure 7** below, the following and most notable (node 09TOWN00502 represents the commencement of the Tobermaclugg stream) information has been yielded from said fluvial 'Lucan to Chapelizod' flood extent map which is tabulated below as follows;

Node Label	Water Level (10% AEP)	Flow (m3/s) 10% AEP	Water Level (1% AEP)	Flow (m3/s) 1% AEP	Water Level (0.1% AEP)	Flow (m3/s) 0.1% AEP
09TOWN00502	72.58	0.01	72.62	0.02	72.66	0.03

With regards to the existing topography attributed to the proposed lands site, it has been determined that in the event that a 1 in 100 or 1 in 1000 year event was to occur, that the existing Tobermaclugg stream channel, as displayed in Figure 7 below, would be capable of conveying and containing raised water levels yielded from either storm event materialising presently and/or into the future.

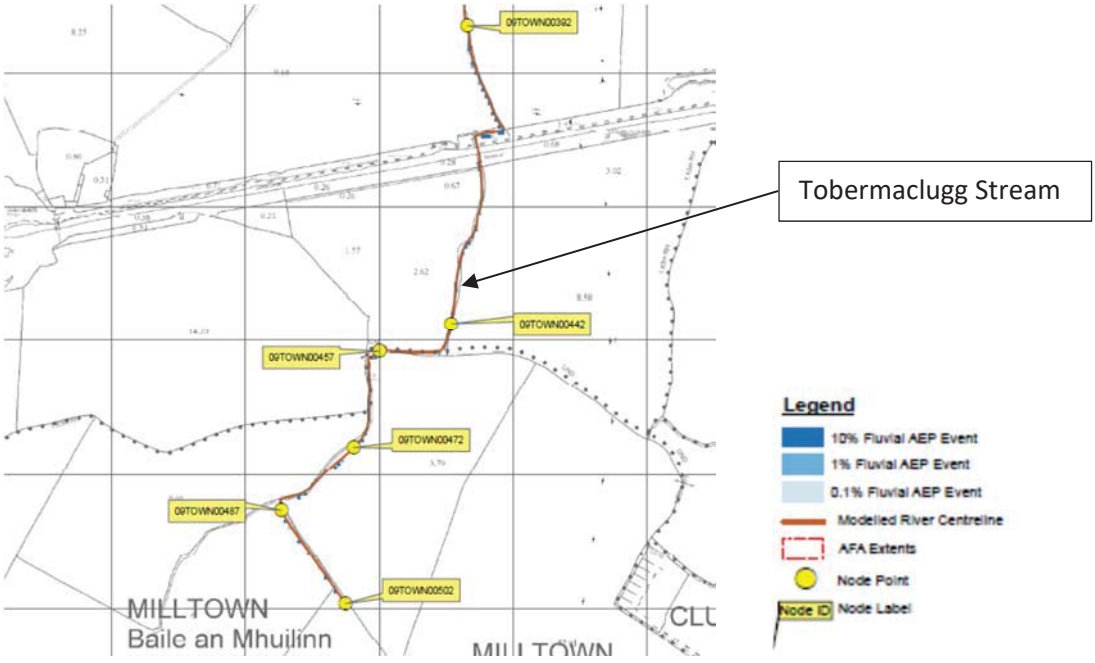


Figure 7 Extract from 'Lucan to Chapelizod' CFRAM maps of portion of the Grange Castle West site

Further inspections were undertaken based around RPS's Fluvial Flood Zone Mapping that was incorporated within SDCC's Strategic Flood Risk Assessment adopted within South Dublin's County Development Plan 2016 -2022. Information yielded from the above referenced RPS flood zone mapping ultimately places the existing Tobermaclugg stream and the proposed 478 acres of rezoned

lands outside flood Zones A & B. For further details, please refer to **Appendix E** with regards to RPS Fluvial Flood Zone mapping drawing.

An initial assessment of the flood risk for the proposed lands is made with reference to existing published information provided by the Office of Public Works (OPW). This data is comprised of (i) Preliminary flood risk assessment mapping (PFRA) and (ii) records of historical flood events in the environs and the periphery elements of the proposed lands.

The PFRA mapping (See **Appendix F**) is based on broad scale simple analysis and cannot be deemed accurate for any specific location. A review of Map 237 for the site environs shows that there is little or no risk that the proposed lands would be subjected to flooding for the 1% annual exceedance potential (AEP) event (1 in 100 year return period).

When assessing and reviewing the OPW CFRAM (Catchment Flood Risk Management Assessment and Management) Fluvial Flood Extent Maps (see **Appendix D**) for Baldonnel, Lucan to Chapleizod and Hazlehatch maps for the 0.1% AEP event (1 in 1000), 1% AEP Event (1 in 100) and 10% AEP event (1 in 10), it was apparent that there is no risk that the proposed lands would be subject to flooding.

When assessing and reviewing the OPW CFRAM Fluvial AEP Flood Depth Maps (see **Appendix G**) for Baldonnel, Lucan to Chapleizod and Hazlehatch maps for the 0.1% AEP event (1 in 1000), 1% AEP Event (1 in 100) and 10% AEP event (1 in 10), again it has been assessed that there is no risk that the proposed lands would be subject to flooding.

Upon review of the OPW 'Fluvial Risk to the Environment' (see **Appendix H)** for Baldonnel, Lucan to Chapleizod and Hazlehatch maps, it has been assessed that the proposed lands contains no risk to it surrounding environs.

It has also been established that no tidal/coastal flood maps were generated for the site study area under consideration and therefore no further information was available to be assessed and included in this report.

3.8.2 Flood Zone

In this Strategic Flood Risk Assessment the precautionary principals advocated in The Planning System and Flood Risk Management Guidelines was followed. There is no further evidence to suggest that the proposed lands have flooded in the past. Furthermore, the indicative Lucan to Chapelizod, Hazelhatch and Baldonnell PFRA and CFRAM maps and the SFRA for South Dublin County Development Plan 2016 to 2022 places the proposed lands outside both Flood Zone A (i.e. an area likely to suffer flooding in a 1 in 100 year fluvial event) and Flood Zone B (i.e. an area likely to suffer flooding in a 1 in 1000 year fluvial event).

Therefore CSEA have concluded that the proposed lands is located outside both Flood Zone A (i.e. an area likely to suffer flooding in a 1 in 100 year fluvial event) and Flood Zone B (i.e. an area likely to suffer flooding in a 1 in 1000 year fluvial event).

4 Initial Flood Risk Assessment

4.1 Source of Flooding

When carrying out a flood risk assessment one should consider all the potential flood risks and sources of flood water at the site. In general the relevant flood sources are:

Fluvial:
Fluvial Flooding is the result of a river exceeding its capacity and excess water spilling out onto the adjacent floodplain. A flood risk in the vicinity of proposed development from fluvial sources does exist.

Pluvial:
Pluvial flooding is the result of rainfall-generated overland flows which arise before run-off can enter any watercourse or sewer. It is usually associated with high intensity rainfall. Flood risk from pluvial sources is not thought to be significant at this site due to the topography of the site and the existing drainage characteristics of the subsoil.

Coastal:
Coastal flooding is the result of sea levels which are higher than normal and result in sea water overflowing onto the land. It is not thought that there is a significant risk of coastal flooding with respect to the location of the proposed site.

4.2 Flood Zone

With reference to Section 3.8.2 of this report, it has been determined that the proposed lands is located outside Flood Zones A & B. On this basis, CSEA have taken no further action with regards to justification test attributed to the proposed site.

4.3 Vulnerability

Table 3.1 of the Planning System and Flood Risk Management Guidelines for Planning Authorities gives a detailed classification of vulnerability of different types of development. The existing zoning objective for the proposed 478 acres of rezoned lands is '***RU*** - *To protect and improve rural amenity and to provide for the development of agriculture'*. This Strategic Flood Risk Assessment has been prepared as part of the SDCC re-zoning application for the proposed lands with the zoning objective being retitled as '***EE*** - *To provide for enterprise and employment uses'*.

This Strategic Flood Risk Assessment has been prepared based on the existing zoning objectives where the vulnerable classification for the proposed rezoned land site would duly fall under the 'Less Vulnerable Developments' Zone B category. If and when the proposed 478 acres of lands has been successfully rezoned to achieve zoning objective EE, the existing lands under consideration will potentially be carved into land parcels of various sizes and shapes. Each owner of said land parcels will carry out their own Site Specific Flood Risk Assessment at planning stage based on the type of industry proposed and the infrastructure required to bring it into full service.

The guidelines state that Flood Zone B or C are suitable for less vulnerable development and Flood Zone A is not considered suitable (refer to Tables 3.1 and 3.2 of the Guidelines). It is noted that the proposed lands would fall under the 'Less Vulnerable Developments' Zone B category due to the lands been currently utilised as arable and pastoral farming. Based on Table 3.2 identified within The Planning System and Flood Risk Management Guidelines, a justification test is therefore not required to be undertaken for the proposed lands.

4.4 Potential Impact on Flooding Elsewhere

Upon assessing the PFRA maps, OPW CFRAM maps, the Strategic Flood Risk Assessment for SDCC Development Plan 2016 to 2022 and OPW Interactive flood maps for the proposed lands footprint assessed under the existing zoning objective ***RU*** - *To protect and improve rural amenity and to provide for the development of agriculture'*. , it is CSEA's opinion that there is little or no evidence to suggest that there is any risk of flooding for both a 1 in 100 and a 1 in 1000 fluvial events to any of the proposed 478 acres of rezoned lands under consideration.

Furthermore and due to the fact that the proposed lands site falls outside flood zones A and B respectively, it is CSEA's opinion that any potential flooding to lands outside the footprint of the proposed lands will not be adversely affected if and when the proposed lands are fully developed under the rezoning objective **EE** - *'To provide for enterprise and employment uses'*. Through detailed design, the introduction of sustainable drainage systems, flood risk management and proper planning procedures, any potential flood risks to lands/properties located outside the proposed lands footprint will ultimately be avoided.

4.5 Flood Risk Management

Flood risk management under the EU Floods Directive aims to minimise the risks arising from flooding to people, property and the environment. Minimising risk can be achieved through structural measures that block, restrict or divert the pathways of floodwaters, such as river defences or non-structural measures that are often aimed at reducing the vulnerability of people and communities such as flood warning, effective flood emergency response, or resilience measures for communities or individual properties. With regards to the proposed lands, it is not anticipated that any of the above referenced measures will need to be introduced to minimise flood risks to any of the existing lands or properties that currently fall within the proposed lands footprint.

If the proposed 478 acres of land are successfully rezoned to achieve zoning objective **EE** - *'To provide for enterprise and employment uses'* then it will be the responsibility of each landowner who purchases lands for future development within this rezoned area to carry out their own Site Specific Flood Risk Assessment during the planning stage attributed to that specific development.

5 Conclusion

All existing information has been reviewed regarding flood risk in the proposed lands area.

Inspections were undertaken based around RPS's Fluvial Flood Zone Mapping that was incorporated within SDCC's Strategic Flood Risk Assessment adopted within South Dublin's County Development Plan 2016 -2022. Information yielded from the above referenced RPS flood zone mapping ultimately places the proposed 478 acres of rezoned lands outside flood Zones A & B.

The PFRA mapping shows that there is little or no risk that the proposed lands would be subjected to flooding for the 1% annual exceedance potential (AEP) event (1 in 100 year return period).

When assessing and reviewing the OPW CFRAM (Catchment Flood Risk Management Assessment and Management) Fluvial Flood Extent Maps for Baldonnel, Lucan to Chapleizod and Hazlehatch maps for the 0.1% AEP event (1 in 1000), 1% AEP Event (1 in 100) and 10% AEP event (1 in 10), it was noted that there is no risk that the proposed lands would be subject to flooding.

When assessing and reviewing the OPW CFRAM Fluvial AEP Flood Depth Maps for Baldonnel, Lucan to Chapleizod and Hazlehatch maps for the 0.1% AEP event (1 in 1000), 1% AEP Event (1 in 100) and 10% AEP event (1 in 10), again it has been assessed that there is no risk that the proposed lands would be subject to flooding.

There is no further evidence to suggest that the proposed lands have flooded in the past. Furthermore, the indicative Lucan to Chapelizod, Hazelhatch and Baldonnell PFRA & CFRAM maps and the SFRA for South Dublin County Development Plan 2016 to 2022 places the proposed lands outside both Flood Zone A (i.e. an area likely to suffer flooding in a 1 in 100 year fluvial event) and Flood Zone B (i.e. an area likely to suffer flooding in a 1 in 1000 year fluvial event).

This Strategic Flood Risk Assessment has been prepared based on the existing zoning objectives where the vulnerable classification for the proposed lands site would duly fall under the 'Less Vulnerable Developments' Zone B category. If and when the proposed lands has been successfully rezoned to achieve zoning objective EE, the proposed lands will then potentially be carved into land parcels of various sizes and shapes. Each proprietor of said land parcels will carry out their own Site Specific Flood Risk Assessment at planning stage based on the type of industry/structures proposed and the relevant infrastructure required to bring it into full service.

5 Conclusion

All existing information has been reviewed regarding flood risk in the proposed lands area.

Inspections were undertaken based around RPS's Fluvial Flood Zone Mapping that was incorporated within SDCC's Strategic Flood Risk Assessment adopted within South Dublin's County Development Plan 2016 -2022. Information yielded from the above referenced RPS flood zone mapping ultimately places the proposed 478 acres of rezoned lands outside flood Zones A & B.

The PFRA mapping shows that there is little or no risk that the proposed lands would be subjected to flooding for the 1% annual exceedance potential (AEP) event (1 in 100 year return period).

When assessing and reviewing the OPW CFRAM (Catchment Flood Risk Management Assessment and Management) Fluvial Flood Extent Maps for Baldonnel, Lucan to Chapleizod and Hazlehatch maps for the 0.1% AEP event (1 in 1000), 1% AEP Event (1 in 100) and 10% AEP event (1 in 10), it was noted that there is no risk that the proposed lands would be subject to flooding.

When assessing and reviewing the OPW CFRAM Fluvial AEP Flood Depth Maps for Baldonnel, Lucan to Chapleizod and Hazlehatch maps for the 0.1% AEP event (1 in 1000), 1% AEP Event (1 in 100) and 10% AEP event (1 in 10), again it has been assessed that there is no risk that the proposed lands would be subject to flooding.

There is no further evidence to suggest that the proposed lands have flooded in the past. Furthermore, the indicative Lucan to Chapelizod, Hazelhatch and Baldonnell PFRA & CFRAM maps and the SFRA for South Dublin County Development Plan 2016 to 2022 places the proposed lands outside both Flood Zone A (i.e. an area likely to suffer flooding in a 1 in 100 year fluvial event) and Flood Zone B (i.e. an area likely to suffer flooding in a 1 in 1000 year fluvial event).

This Strategic Flood Risk Assessment has been prepared based on the existing zoning objectives where the vulnerable classification for the proposed lands site would duly fall under the 'Less Vulnerable Developments' Zone B category. If and when the proposed lands has been successfully rezoned to achieve zoning objective EE, the proposed lands will then potentially be carved into land parcels of various sizes and shapes. Each proprietor of said land parcels will carry out their own Site Specific Flood Risk Assessment at planning stage based on the type of industry/structures proposed and the relevant infrastructure required to bring it into full service.

Appendix A

Comhairle Contae
Átha Cliath Theas
South Dublin County Council

GRANGE CASTLE WESTERN LANDS
AREAS TO BE RE-ZONED

Clifton Scannell Emerson Associates

Dwg No: 17_129_00_1009 Scale: NTS Date: October 2017

Appendix B

SOUTH DUBLIN COUNTY COUNCIL
COMHAIRLE CHONTAE ATHA CLIATH THEAS

Bosca 4122
Lar an Bhaile, Tamhlacht
Baile Atha Cliath 24

Telefon: 01-4149000
Facs: 01-4149101

ENVIRONMENTAL SERVICES DEPARTMENT
P.O. Box 4122
Town Centre, Tallagh
Dublin 24

Telephone: 01-4149000
Fax: 01-4149101

South Dublin County Report on Flooding 5th & 6th November, 2000

Rainfall

- Rainfall varied across the County from the 76mm recorded at Baldonnell to 137mm recorded at Boharnabreena for the period 9.00a.m. Sunday to 9.00a.m. Monday.

Geography of South Dublin

- South Dublin County Council Administrative Area is divided into 3 main catchment areas, drained respectively by the Griffeen, Camac and Dodder Rivers.

- The most serious flooding events occurred in the Griffeen Catchment area. Drainage works carried out post '93, Camac Phase 1, effectively served to protect the Camac Catchment from serious flooding and thus protected urban areas downstream of Corkagh Park, in particular Clondalkin.

  Some flooding occurred in the Dodder Catchment at Dodder Park Road and Lower Dodder Road, also the Tallagh Stream, a tributary of the Dodder.

  To the west of the Griffeen Catchment some flooding occurred in areas that ultimately drain to the Liffey via a series of watercourses and small streams flowing northwards through Kildare in the Newcastle/Hazelhatch area.

Details of flooding

- Serious flooding occurred in the Griffeen Catchment particularly in 2 areas.

  To the north at its confluence with the Liffey, the Griffeen river caused considerable flooding in the old village of Lucan.

  The second area affected by serious flooding was in the Griffeen Valley just to the north of the Dublin Cork Railway line in the new housing areas of Old Forge and Grange Manor estates.

Chronology & Response

- South Dublin County Council received its first emergency call at 12.30p.m. on 5.11.00.

  Consequent on this call and following inspections by Supervisory personnel, Drainage Department work crews were mobilised at 2.00p.m. on the 5.11.00. Work crews from the Council's Roads, Cleansing and Housing sections subsequently joined in the emergency works. These squads remained on duty from 2.00p.m. 5.11.00 to 3.00a.m. on 6.11.00 and from 8.00a.m. on 6.11.00 to 1.00a.m. on 7.11.00 to deal with the various problems arising.

  On Sunday evening and Sunday night, squads were engaged in the cleaning or river and culvert screens to facilitate flows, filling, distribution of sandbags to protect vulnerable areas and freeing blockages throughout the system caused by debris.

During this period excavations were carried out to lower the bank of the Camac at Corkagh Park to allow the pitches to serve as attenuation ponds.

- Early on Monday morning (6.11.00) at approximately 4.00a.m., the Griffeen broke its banks at the northern extremity of Griffeen Valley Park (north of the N4) and flooded Lucan Village.

  Between 4.00a.m. and 7.00a.m. on Monday the Griffeen also flooded the estates of Old Forge and Grange Manor in the South Lucan Area.
  This flooding persisted throughout Monday and the Griffeen was only returned to its channel at approximately 8.00p.m. on Monday night.

Emergency Plan

- The extent of the storm and the flooding caused local emergency plans to be put into operation. There were considered adequate to deal with the situation which developed. It was not considered necessary to declare a major emergency in South Dublin due to the very specific and confined areas affected.

Road Closures
The only national route closed was the national secondary road N81 at Jobstown (11.00p.m. 5.11.00 – 4.00p.m. 6.11.00).

Regional and Local Roads closed included:

Adamstown Road at Lucan Village (4.00a.m. 6.11.2000 – 9.11.2000)
Lucan Ballowen Road (9.00a.m. – 4.00p.m. 6.11.2000)
New Link Road at Grange Manor (8.00a.m. – 8.00p.m. 6.11.2000)
Adamstown Road Flooded but passable.
Alymer Road (4.00a.m. – 8.00p.m. 6.11.2000)
Lucan Peamount (Polly Hops) (4.00a.m. – 8.00p.m. 6.11.2000)
College Lane (8.00a.m. – 8.00p.m. 6.11.00 – passable)
Hatch road flooded – passable
Belgard Road flooded – passable
Fortunestown Lane (8.00a.m. – 8.00p.m.)
Barnhill Road (Weirview Cottages) 4.00a.m. 6.11.2000 – 9.11.2000

Properties Flooded

Residential
12 houses at Avonmore Park (Nos. 7 – 18)
4 No. houses, Kiltipper Road, Tallaght (individually named)
25 No. houses, Old Forge Estate, Lucan
18 No. houses, Grange Manor Park/Drive, Lucan
House beside 'Griffeen Valley Nursing Home', Arthur Griffith Park, Lucan
House to rear of 'Courtneys Pub', Lucan Village
2 No. Bungalows Newcastle Village
2 No. Bungalows beside Newcastle Treatment Works
2 No. Houses, Knocklyon Avenue, Firhouse
3 No. Houses, Edmonstown Road (individually named)
15 No. Houses, Woodview Cottages, Rathfarnham
1 house beside Chemserve on Edmonstown Road

'Homeville' opposite Mount Carmel Park, Firhouse3 Houses at Hazelhatch

Total number of residential properties known to be flooded: 90.

Commercial
'Virtus Ltd' Haydens Lane, Lucan

All the following in Lucan Village:
Centra Supermarket
Village Oriental Food Stores
Spice Inn Chinese Fast
Creative Flowers
Irish Permanent
O'Neills Pub
Kennys Pub
Courtneys Pub
Bank of Ireland
Pat Toolan Bookmaker
Carrolls Butchers

Also:
Jobstown Inn, Jobstown, Tallaght
'Johns Takeaway' Walkinstown Roundabout
'Motorworld' Robinhood Industrial Estate and adjoining premises
Chemserve on Edmondstown Road
'Eurometals' Mill Road, Saggart

Total number of commercial known to be flooded: 17.

The above are the premises which have come to the attention of this South Dublin County Council to date.

Evacuations

- No large-scale evacuations were required. However in a number of limited cases South Dublin County Council personnel helped to evacuate houses, a particular example being an expectant mother in the Old Forge estate.
- These evacuations were from Private Residential houses.
- No alternative accommodation was either requested or provided.
- We do not consider that anyone is still evacuated due to the flooding.

General

- No water treatment works were affected due to the flooding.
- Certain sewerage systems were affected by the flooding:

  (a) The treatment Plant at Newcastle was submerged, preventing its operations for 24 hours.

  (b) The Lucan Low Level Pumping Station on the Adamstown Road was flooded. As a result the pump motors were burnt out and need to be replaced. Alternative pumping arrangements will be in place by 10.11.00.

ESB International

MINUTES OF MEETING

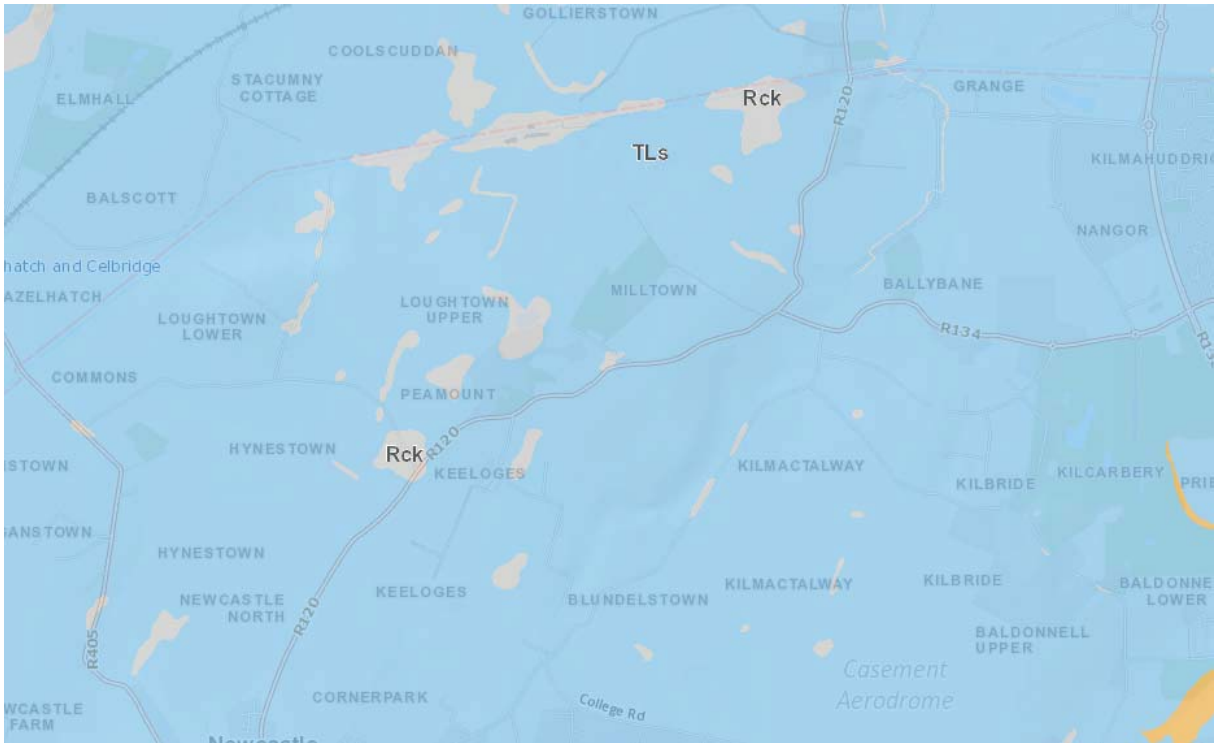
Document No. / File Reference:	P4D403A – F310 – 030 – 004	
Project No.:	PD403A	
Project Title:	OPW Flood Hazard Mapping – Phase 1	
Purpose of Meeting:	South Dublin County Council – Areas of flooding – Drainage Division and Roads(North County)	
Participating:	Senior Executive Engineer Drainage Senior Engineer Env Serv (part-time) Roads Engineer Search Manage)	South Dublin County Council (SDCC) South Dublin County Council South Dublin County Council ESBI
Venue:	South Dublin County Council Offices, Tallaght	
Date(s) of Meeting:	25/04/05	
Copies to:	SDCC	
Status:	**Final**	
Compiled by:	Search Manager	
Approved for ESBI:	Search Manager	
Approved for South Dublin County Council	SEE Environmental Services Drainage	
Date:		

ESB INTERNATIONAL LTD.
Stephen Court, 18/21 St. Stephen's Green, Dublin 2, Ireland
Telephone: +353-1-7038000 Fax: +353-1-6764400
Website: www.esbi.ie

ITEM NO.	MINUTE	ACTION BY
1	**Documents Issued**	
1.1	The following were issued by SDCC to ESBI: A. A map of South Dublin County illustrating areas vulnerable to flooding derived from discussions within the Drainage Section of SDCC. B. A list of locations vulnerable to flooding generated by the SDCC Roads Section (North) was presented. C. A CD issued by JB Barry to SDCC containing ▪ Report of Flood Event 5/6 November 2000, ▪ Hydro Environmental Report on Lucan Village, ▪ Flood Extent mapping (Adobe pdf) ▪ Flood photos and ▪ As-built Flood Defence Asset drawings (AutoCAD).	
1.2	At the meeting, the locations vulnerable to flooding indicated on Map A (see heading 1.1) were reviewed by SDCC. The locations were assigned numbers and described. The locations and descriptions are listed below under Heading 2. The flooding information provided by the Roads Section (Document B heading 1.1) was added to Map A, then numbered and is described below under Heading 3.	
2	**Flood Locations (Drainage Section)**	
2.1	1. Newcastle Village – Glebe – Recurring. Basement of house. Flood ID 1181. 2. Peamount Road Recurring. Flood ID 1182. 3. Beech Row Cottages Ronanstown Recurring. 6 houses affected. Flood ID 1183. 4. Cappaghmore Culvert Recurring – 9th Lock Road. Flood ID 1184. 5. Camac Culvert recurring – Irish Farm Centre, Old Naas Road. Problems with structural integrity of culvert. Flood ID 1185. 6. Killinarden Stream Jobstown recurring. Blocked regularly with debris. Flood ID 1186. 7. Robinhood Stream Walkinstown Recurring. Flood ID 1187. 8. Whitehall Road Kimmage Recurring. Drainage Related. Flood ID 1188. 9. Dodder Mount Carmel Park recurring. Parkland. Flood ID 1189. 10. Dodder – Lower Dodder Road Recurring. Flood ID 1190. 11. Tobermaclog Backweston Stream Recurring. Refer to OPW and Kildare County Council. Flood ID 1211 12. Baldonnell Barney's Lane Recurring. Flood ID 1214 13. Newcastle Greenoge Recurring. Flood ID 1215 14. Palmerston – Mill Lane. Regular flooding near Liffey. Flood ID 1216 15. Camac Watery Lane Clondalkin Recurring. Flood ID 1220 16. Owendoher Stream Edmonstown Road. Nov 2000. Possible link to M50 works. Flood ID 1221 17. Hazelhatch Flooding Shinkeen recurring. Refer to OPW information	
3	**Flood Locations (Engineer - Roads Section – North by telephone)**	
3.1	18. Lucan St Edmonsbury. Flooding of Road. Flood ID 1222 19. Aylmer Road Newcastle. Location to be confirmed. Flood ID 1223 20. Rathcoole Bridge. Affects slip road Dublin bound traffic to Rathcoole. Flood ID	

ITEM NO.	MINUTE	ACTION BY
	1224 21. Lyons Road Newcastle. Recurring. Flood ID 1225	
4.	**Processing of Data**	
4.1	The locations listed under Headings 2 and 3 above will be incorporated into the project database as Flood Events. They will then be mapped in the project GIS as points in accordance with the locations indicated on Map B.	

Appendix C



GSI Quaternary Details of the proposed lands

Legend:

1. Till Derived from Limestone (TLs)
2. Bedrock Outcrop or Subcrop (Rck)

GSI Bedrock Geology 100K Solid Details of the proposed lands

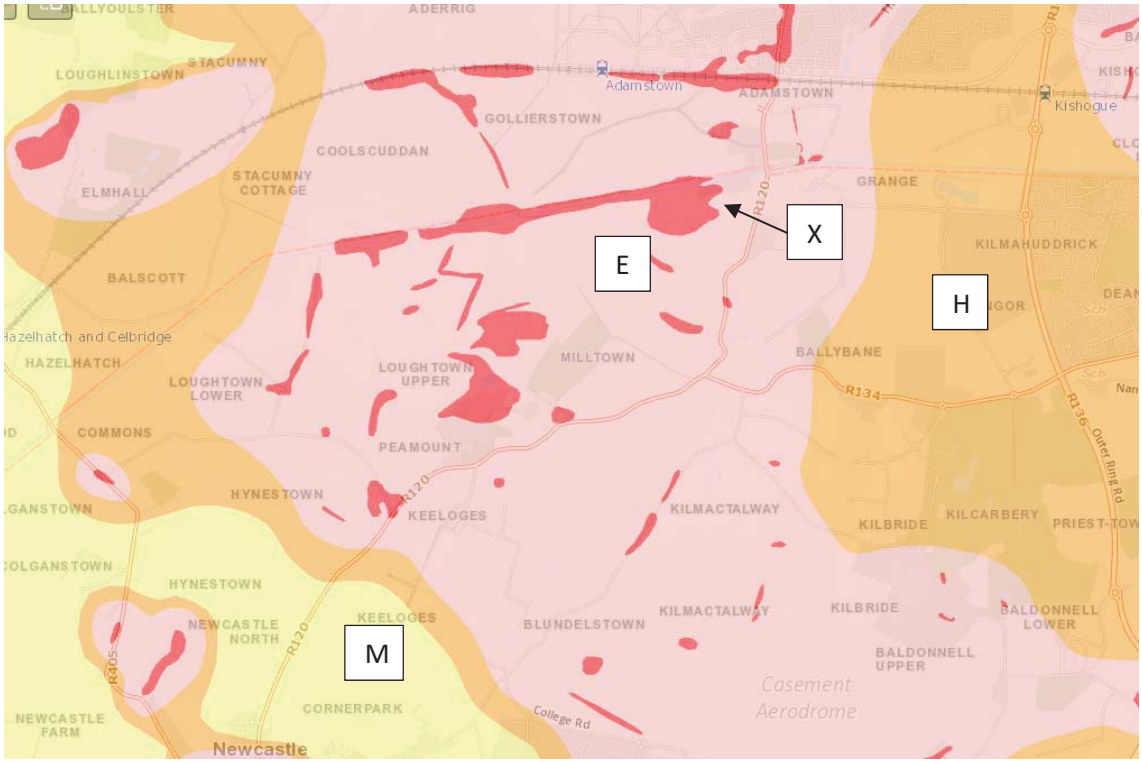
Legend:

1. Lucan Formation (Dark Limestone & Shale - Formation ranges from 300m to 800m in Thickness) (LU)

GSI Groundwater Aquifer Details of the Proposed lands

Legend:

1. Locally Important Aquifer - Bedrock which is Moderately Productive only in local zones (LI)

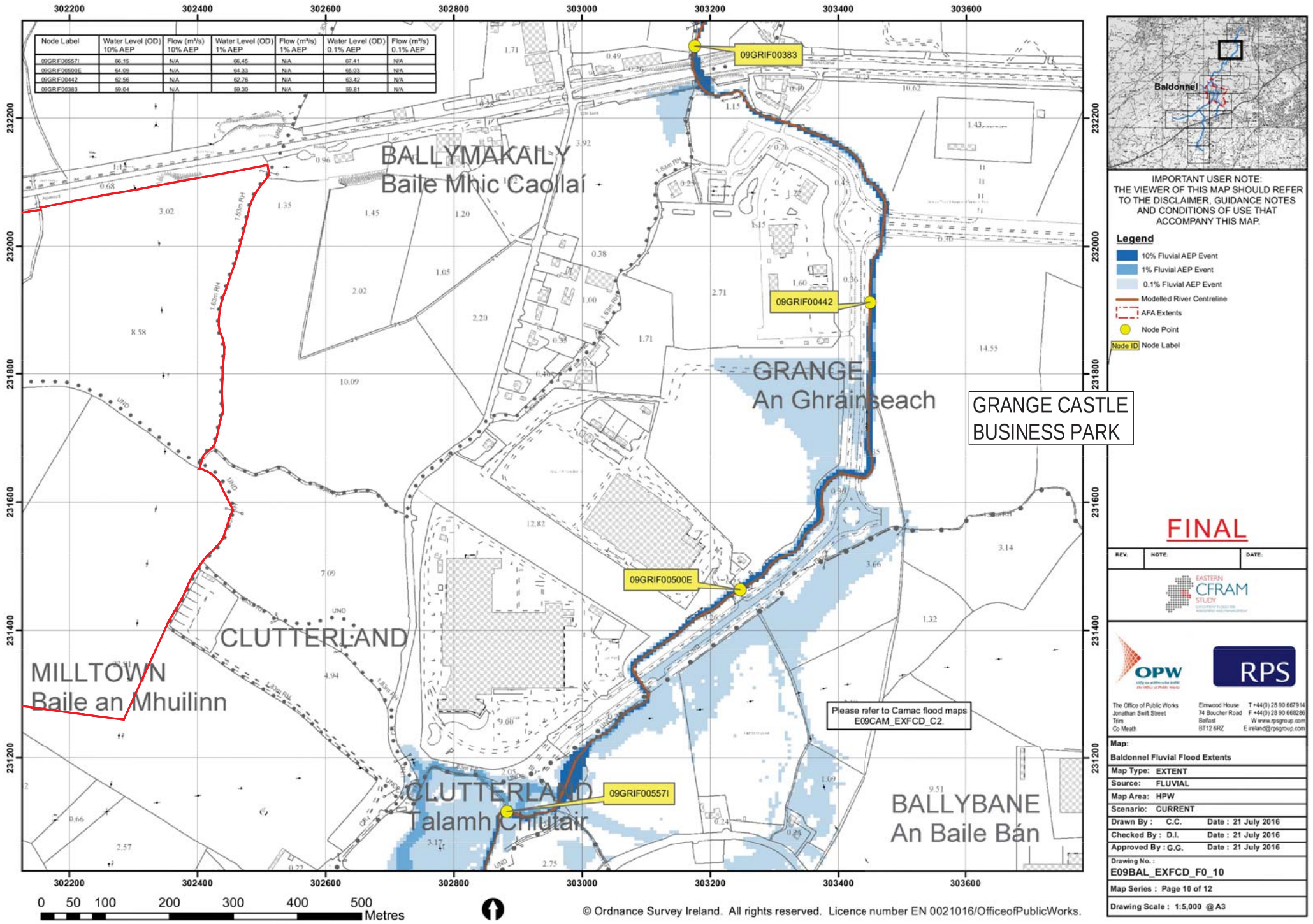


GSI Groundwater Vulnerability Details of the Proposed lands

Legend:

1. Vulnerability Code 'X' - (Description: Rock or Near Surface or Karst)
2. Vulnerability Code 'E' - (Description: Extreme)
3. Vulnerability Code 'H' - (Description: High)
4. Vulnerability Code 'M' - (Description: Moderate)

Appendix D



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
09GRIF00557I	66.15	N/A	66.45	N/A	67.41	N/A
09GRIF00500E	64.09	N/A	64.33	N/A	65.03	N/A
09GRIF00442	62.56	N/A	62.76	N/A	63.42	N/A
09GRIF00383	59.04	N/A	59.30	N/A	59.81	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
- Node Point
- Node ID Node Label

FINAL

REV.	NOTE:	DATE:

EASTERN CFRAM STUDY

OPW

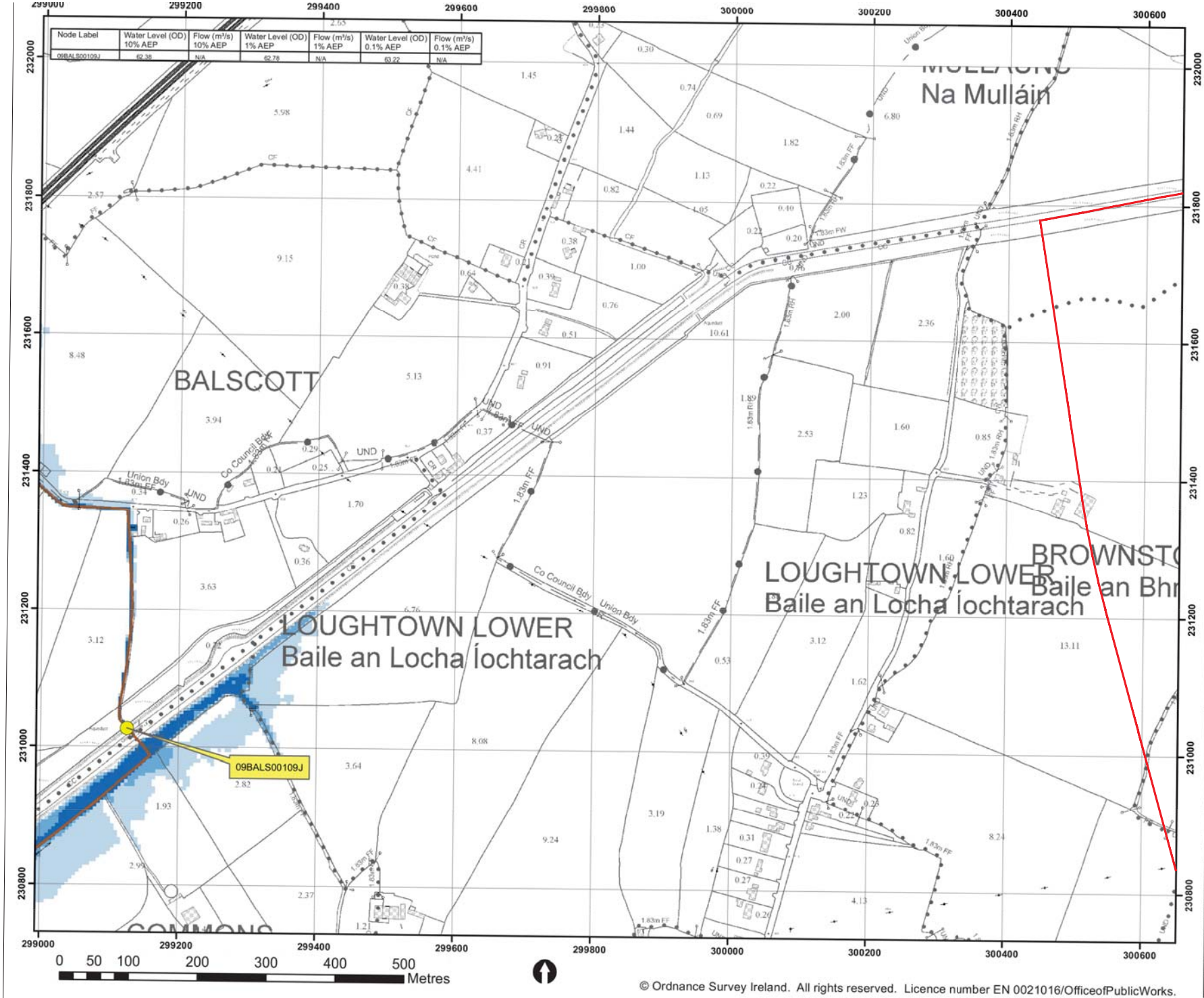
RPS

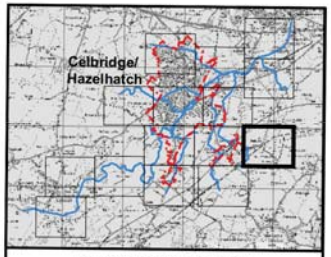
The Office of Public Works
Jonathan Swift Street
Trim
Co Meath

Elmwood House
74 Boucher Road
Belfast
BT12 6RZ

T +44(0) 28 90 667914
F +44(0) 28 90 668286
W www.rpsgroup.com
E ireland@rpsgroup.com

Map:	Baldonnel Fluvial Flood Extents
Map Type:	EXTENT
Source:	FLUVIAL
Map Area:	HPW
Scenario:	CURRENT
Drawn By : C.C.	Date : 21 July 2016
Checked By : D.I.	Date : 21 July 2016
Approved By : G.G.	Date : 21 July 2016
Drawing No. :	E09BAL_EXFCD_F0_10
Map Series :	Page 10 of 12
Drawing Scale :	1:5,000 @ A3





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
- Node Point
- Node ID Node Label

FINAL

REV:	NOTE:	DATE:

EASTERN CFRAM STUDY

OPW

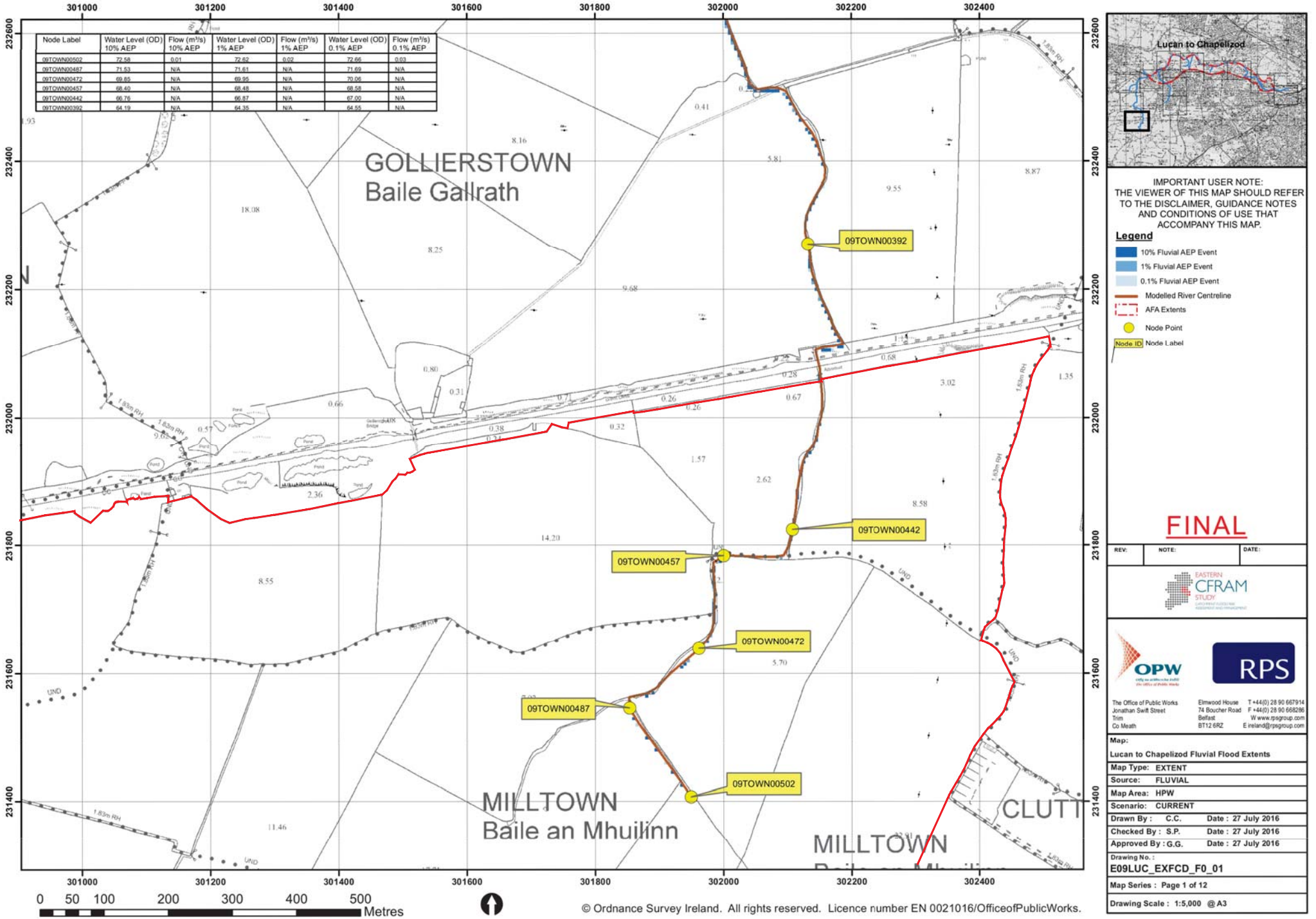
RPS

The Office of Public Works
Jonathan Swift Street
Trim
Co Meath

Elmwood House
74 Boucher Road
Belfast
BT12 6RZ

T +44(0) 28 90 667914
F +44(0) 28 90 668286
W www.rpsgroup.com
E ireland@rpsgroup.com

Map:	Hazelhatch Fluvial Flood Extents
Map Type:	EXTENT
Source:	FLUVIAL
Map Area:	HPW
Scenario:	CURRENT
Drawn By :	F.M.C. Date : 29 July 2016
Checked By :	S.P. Date : 29 July 2016
Approved By :	G.G. Date : 29 July 2016
Drawing No. :	E09CEL_EXFCD_F0_13
Map Series :	Page 13 of 15
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
09TOWN00502	72.58	0.01	72.62	0.02	72.66	0.03
09TOWN00487	71.53	N/A	71.61	N/A	71.69	N/A
09TOWN00472	69.85	N/A	69.95	N/A	70.06	N/A
09TOWN00457	68.40	N/A	68.48	N/A	68.58	N/A
09TOWN00442	66.76	N/A	66.87	N/A	67.00	N/A
09TOWN00392	64.19	N/A	64.35	N/A	64.55	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
- Node Point
- Node ID Node Label

FINAL

REV:	NOTE:	DATE:

EASTERN CFRAM STUDY

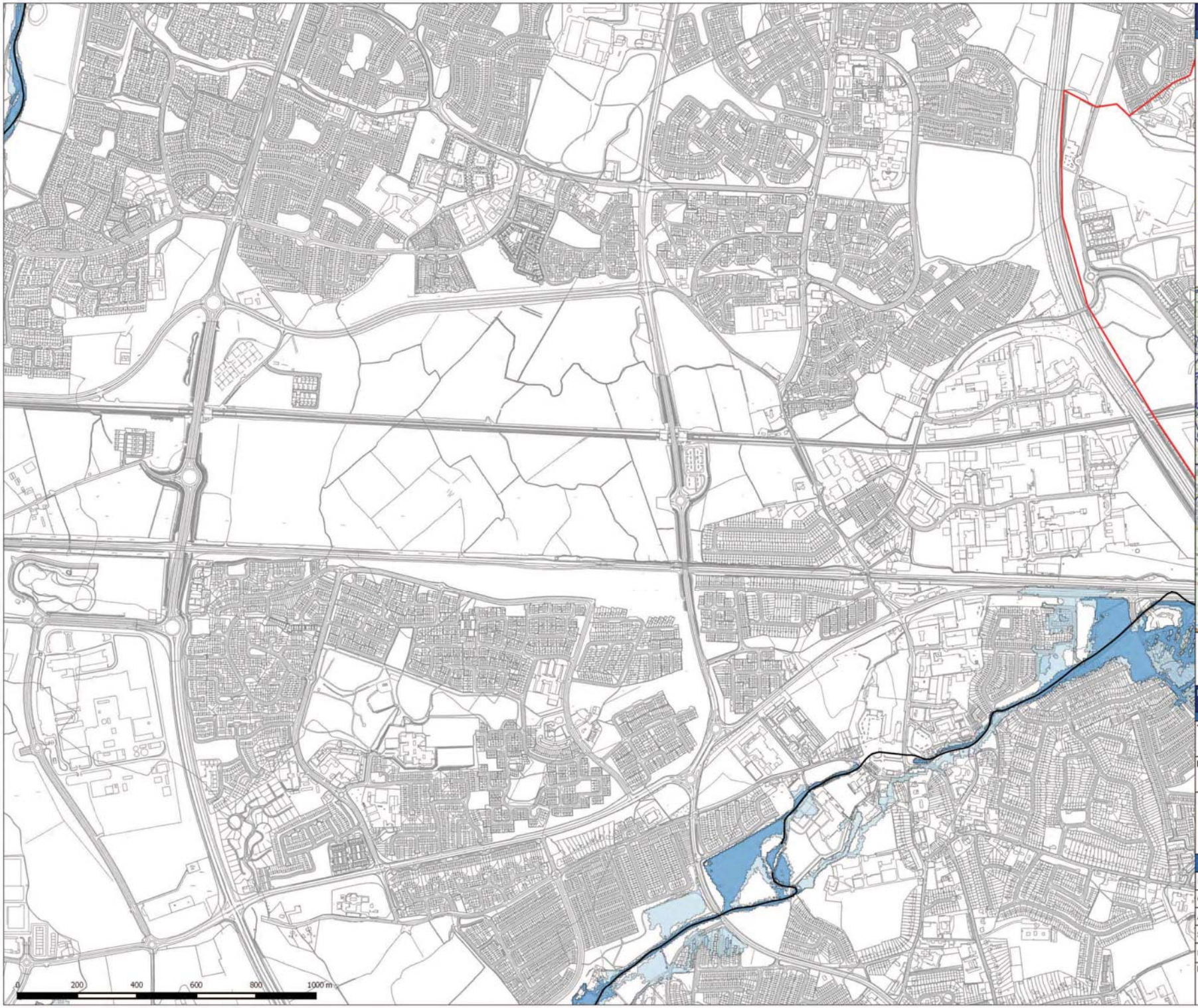
OPW
The Office of Public Works
Jonathan Swift Street
Trim
Co Meath

RPS
Elmwood House
74 Boucher Road
Belfast
BT12 6RZ
T +44(0) 28 90 667914
F +44(0) 28 90 668286
W www.rpsgroup.com
E ireland@rpsgroup.com

Map: Lucan to Chapelizod Fluvial Flood Extents

Map Type:	EXTENT
Source:	FLUVIAL
Map Area:	HPW
Scenario:	CURRENT
Drawn By : C.C.	Date : 27 July 2016
Checked By : S.P.	Date : 27 July 2016
Approved By : G.G.	Date : 27 July 2016
Drawing No. :	E09LUC_EXFCD_F0_01
Map Series :	Page 1 of 12
Drawing Scale :	1:5,000 @ A3

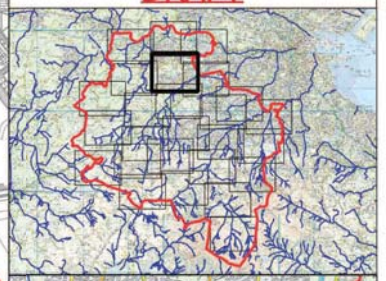
Appendix E

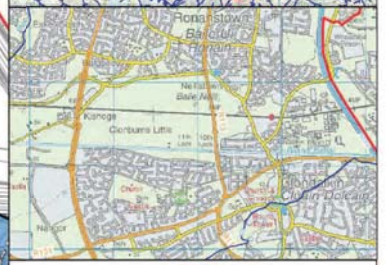


Legend

- Flood Zone A - 1% AEP Flood Extent (1 in 100 chance in any given year)
- Flood Zone B - 1% AEP Flood Extent (1 in 1000 chance in any given year)
- Defended Area
- Watercourse Centreline
- Indicative Flood Extents
- County Boundary

DRAFT





Comhairle Contae
Átha Cliath Theas
South Dublin County Council

Project: Strategic Flood Risk Assessment

Title: Fluvial Flood Zone Mapping

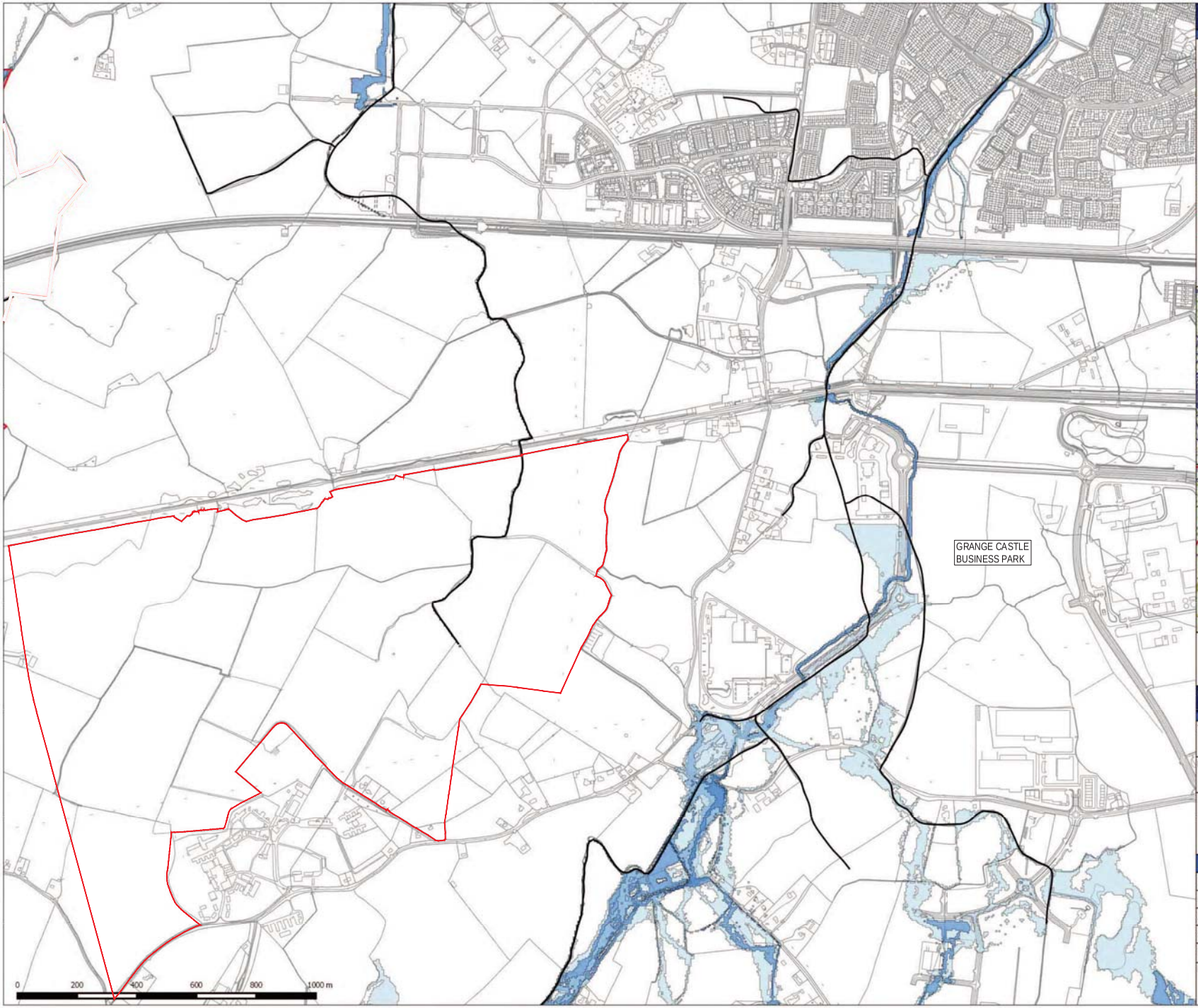
Figure: MDW657_0005

RPS Consulting Engineers
West Pier Business Campus
Dun Laoghaire
Co. Dublin
Tel: +353 1 488 2900
Fax: +353 1 462 0814

Issue Details

Drawn:	BT	Project No.	MDW0657
Checked:	JH	File Ref	MDW0657QG0010F02
Approved:	JH		
Scale:	1:6000 @ A1	Drawing No.	Projection
Date:	14/01/2016	5 of 26	IG

Notes
1. The viewer of this map should refer to the SFRA Report and Disclaimer



Legend

- Flood Zone A - 1% AEP Flood Extent (1 in 100 chance in any given year)
- Flood Zone B - 1% AEP Flood Extent (1 in 1000 chance in any given year)
- Defended Area
- Watercourse Centreline
- Indicative Flood Extents
- County Boundary

DRAFT

Comhairle Contae
Átha Cliath Theas
South Dublin County Council

Project: Strategic Flood Risk Assessment

Title: Fluvial Flood Zone Mapping

Figure: MDW657_0004

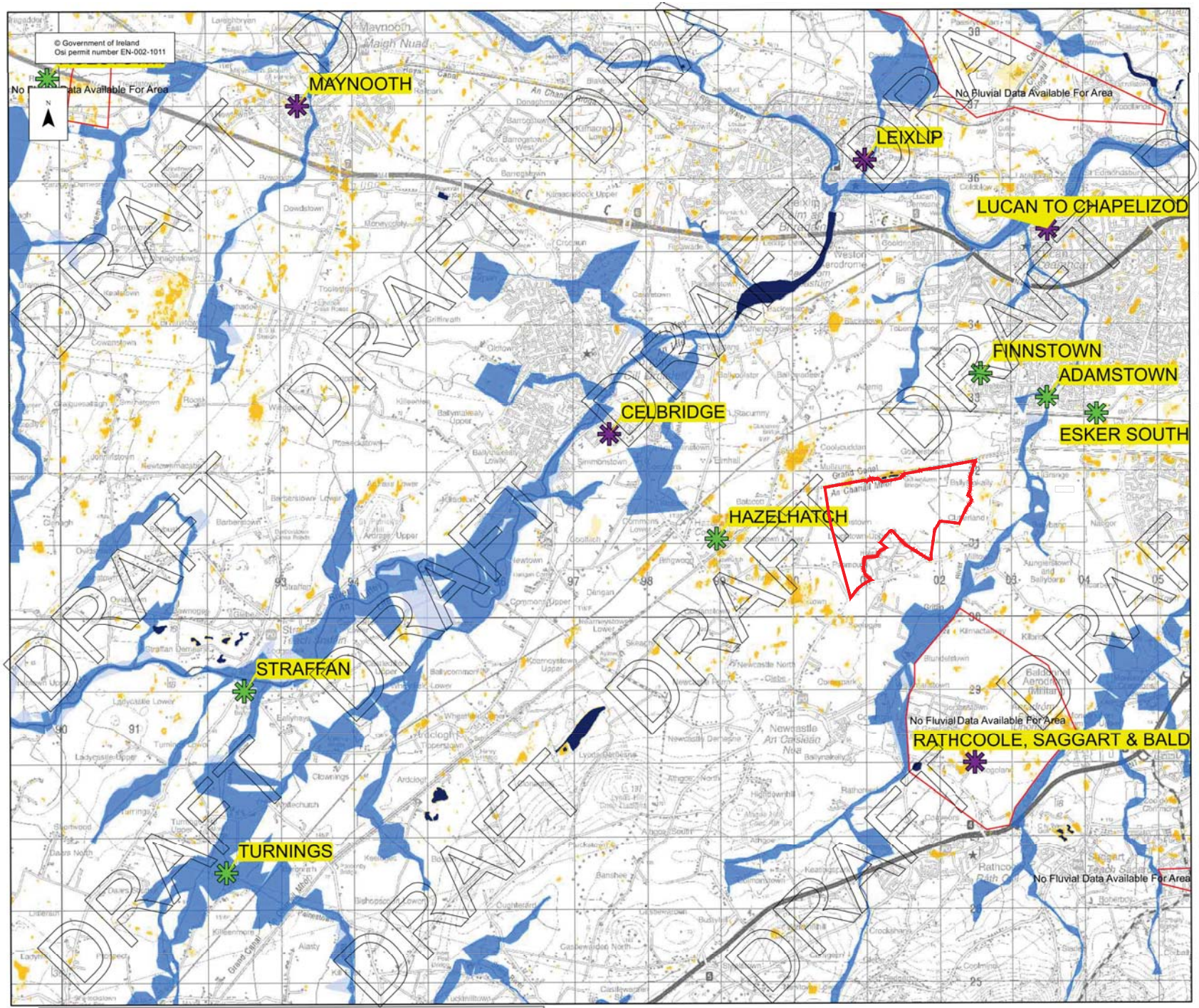
RPS
RPS Consulting Engineers
West Pier Business Campus
Dun Laoghaire
Co. Dublin
Tel: +353 1 488 2900
Fax: +353 1 462 0814

Issue Details

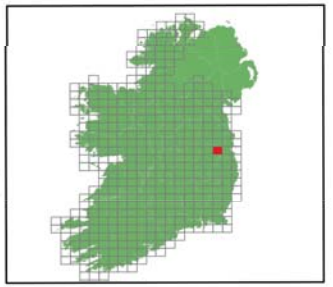
Drawn:	BT	Project No.	MDW0657
Checked:	JH	File Ref	MDW0657QG0010F02
Approved:	JH		
Scale:	1:6000 @ A1	Drawing No.	Projection
Date:	14/01/2016	4 of 26	IG

Notes: 1. The viewer of this map should refer to the SFRA Report and Disclaimer

Appendix F



Location Plan :



Legend:

Flood Extents

- Fluvial - Indicative 1% AEP (100-yr) Event
- Fluvial - Extreme Event
- Coastal - Indicative 0.5% AEP (200-yr) Event
- Coastal - Extreme Event
- Pluvial - Indicative 1% AEP (100-yr) Event
- Pluvial - Extreme Event
- Groundwater Flood Extents
- Lakes / Turloughs

PFRA Outcomes

- Probable Area for Further Assesment
- Possible Area for Further Assesment

Important User Note:

The flood extents shown on these maps are based on broad-scale simple analysis and may not be accurate for a specific location. Information on the purpose, development and limitations of these maps is available in the relevant reports (see www.cfram.ie). Users should seek professional advice if they intend to rely on the maps in any way.

If you believe that the maps are inaccurate in some way please forward full details by contacting the OPW (refer to PFRA Information leaflets or 'Have Your Say' on www.cfram.ie).

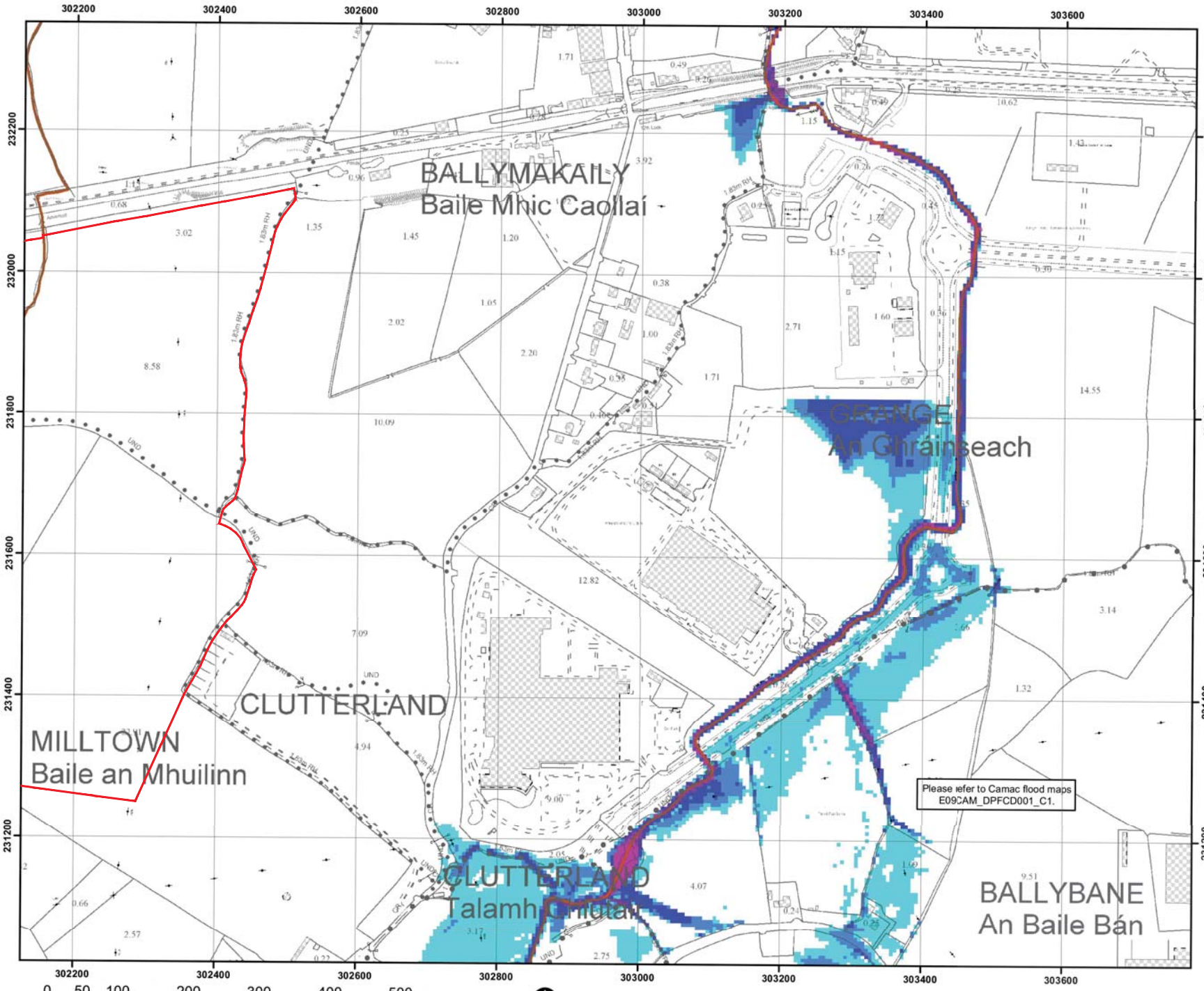
Office of Public Works
Jonathon Swift Street
Trim
Co Meath
Ireland

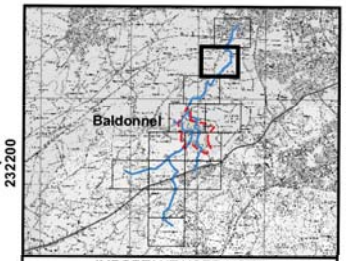
Project :
PRELIMINARY FLOOD RISK ASSESMENT (PFRA)

Map :
PFRA Indicative extents and outcomes
- Draft for Consultation

Figure By : PJW	Date : July2011
Checked By : MA	Date : July 2011
Figure No. : 2019 / MAP / 237 / A	Revision 0
Drawing Scale : 1:50,000	Plot Scale : 1:1 @ A3

Appendix G





IMPORTANT USER NOTE:
THE VIEWER OF THIS MAP SHOULD REFER TO THE DISCLAIMER, GUIDANCE NOTES AND CONDITIONS OF USE THAT ACCOMPANY THIS MAP.

Legend

0.1% Fluvial AEP Flood Depth

- 0 - 0.25m
- 0.25 - 0.5m
- 0.5 - 1m
- 1.0 - 1.5m
- 1.5 - 2m
- >2m
- Modelled River Centreline
- AFA Extents

FINAL

REV:	NOTE:	DATE:

EASTERN CFRAM STUDY

OPW

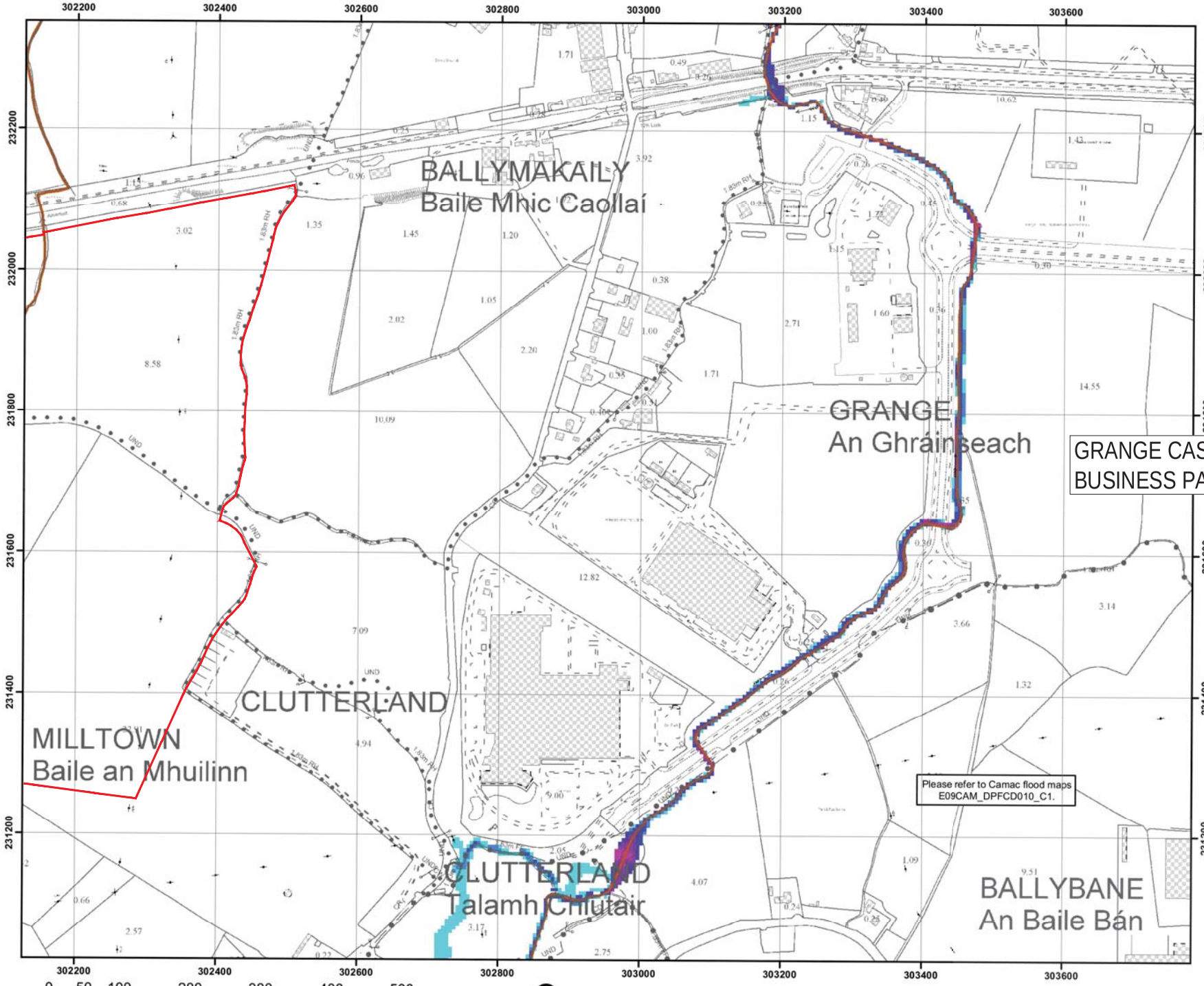
RPS

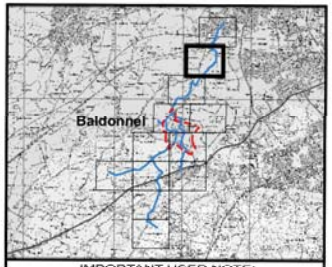
The Office of Public Works
Jonathan Swift Street
Trim
Co Meath

Elmwood House
74 Boucher Road
Belfast
BT12 6RZ

T +44(0) 28 90 667914
F +44(0) 28 90 668286
W www.rpsgroup.com
E ireland@rpsgroup.com

Map:	Baldonnel Fluvial Flood Depths
Map Type:	DEPTH
Source:	FLUVIAL
Map Area:	HPW
Scenario:	CURRENT
Drawn By :	C.C. Date : 29 July 2016
Checked By :	D.I. Date : 29 July 2016
Approved By :	S.P. Date : 29 July 2016
Drawing No. :	E09BAL_DPFCD001_F0_10
Map Series :	Page 10 of 12
Drawing Scale :	1:5,000 @ A3





IMPORTANT USER NOTE:
THE VIEWER OF THIS MAP SHOULD REFER TO THE DISCLAIMER, GUIDANCE NOTES AND CONDITIONS OF USE THAT ACCOMPANY THIS MAP.

Legend

1% Fluvial AEP Flood Depth

- 0 - 0.25m
- 0.25 - 0.5m
- 0.5 - 1m
- 1.0 - 1.5m
- 1.5 - 2m
- >2m

Modelled River Centreline

AFA Extents

FINAL

REV:	NOTE:	DATE:

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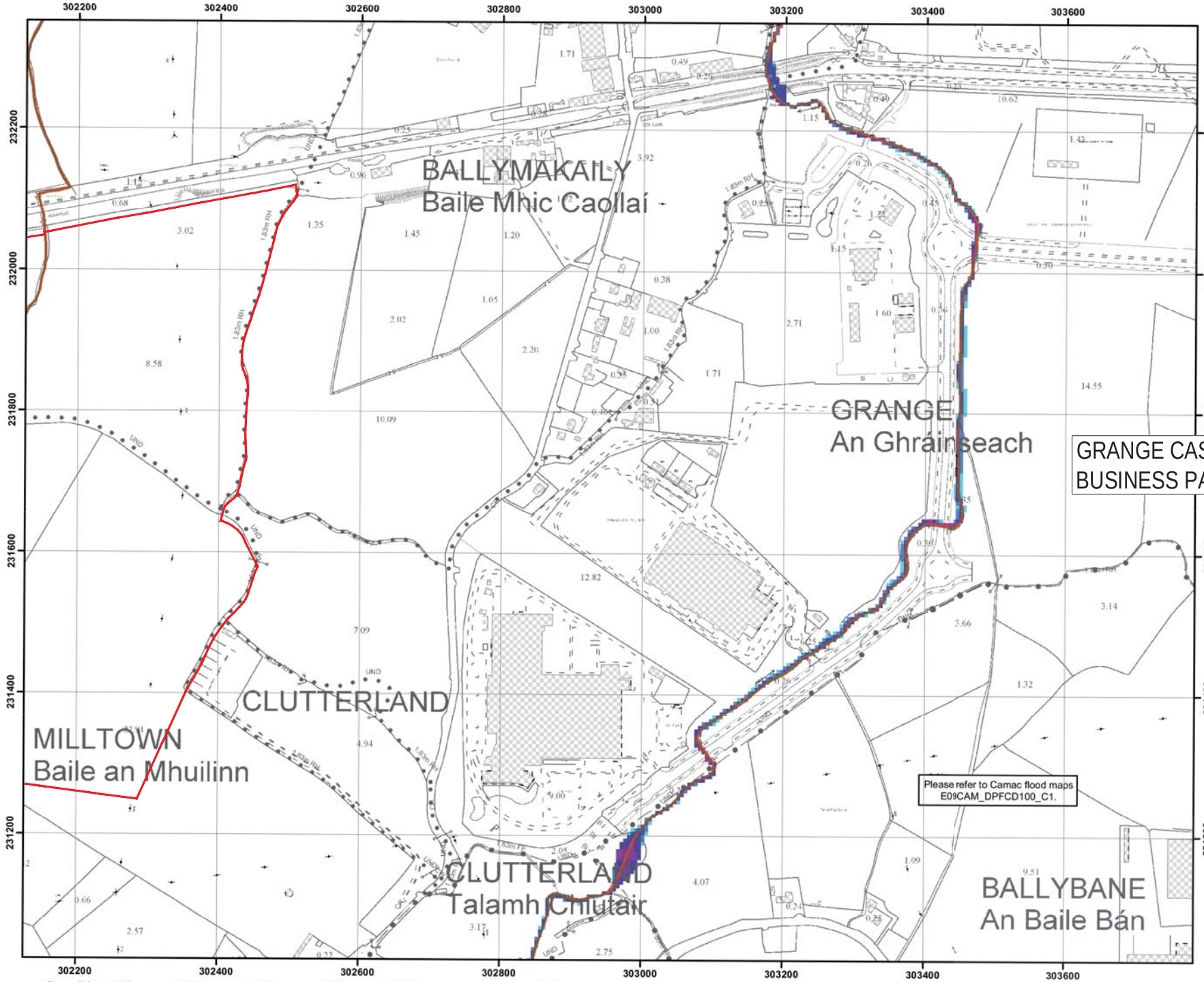
RPS

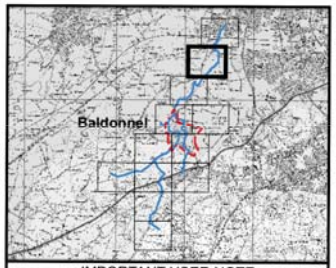
The Office of Public Works
Jonathan Swift Street
Trim
Co Meath

Elmwood House
74 Boucher Road
Belfast
BT12 6RZ

T +44(0) 28 90 667914
F +44(0) 28 90 668286
W www.rpsgroup.com
E ireland@rpsgroup.com

Map:	Baldonnel Fluvial Flood Depths
Map Type:	DEPTH
Source:	FLUVIAL
Map Area:	HPW
Scenario:	CURRENT
Drawn By :	C.C. Date : 29 July 2016
Checked By :	D.I. Date : 29 July 2016
Approved By :	S.P. Date : 29 July 2016
Drawing No. :	E09BAL_DPFCD010_F0_10
Map Series :	Page 10 of 12
Drawing Scale :	1:5,000 @ A3





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 Flood Depth

- 0 - 0.25m
- 0.25 - 0.5m
- 0.5 - 1m
- 1.0 - 1.5m
- 1.5 - 2m
- >2m

Modelled River Centreline
AFA Extents

FINAL

REV:	NOTE:	DATE:

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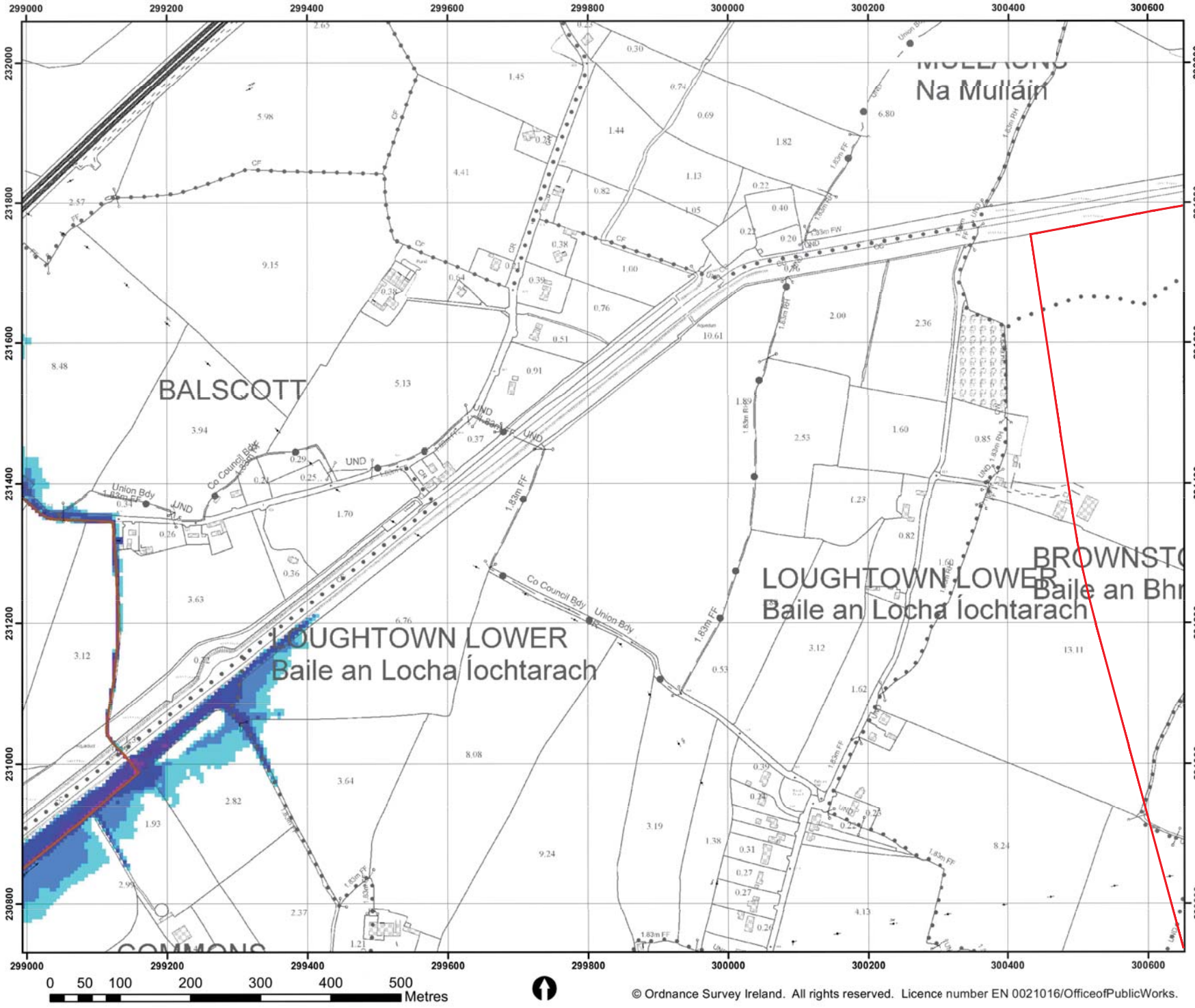
RPS

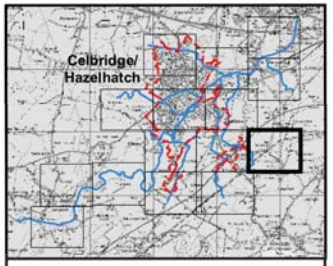
The Office of Public Works
Jonathan Swift Street
Trim
Co Meath

Elmwood House
74 Boucher Road
Belfast
BT12 6RZ

T +44(0) 28 90 667914
F +44(0) 28 90 668286
W www.rpsgroup.com
E ireland@rpsgroup.com

Map:	Baldonnel Fluvial Flood Depths
Map Type:	DEPTH
Source:	FLUVIAL
Map Area:	HPW
Scenario:	CURRENT
Drawn By : C.C.	Date : 29 July 2016
Checked By : D.I.	Date : 29 July 2016
Approved By : S.P.	Date : 29 July 2016
Drawing No. :	E09BAL_DPFCD100_F0_10
Map Series :	Page 10 of 12
Drawing Scale : 1:5,000	@ A3





IMPORTANT USER NOTE:
THE VIEWER OF THIS MAP SHOULD REFER TO THE DISCLAIMER, GUIDANCE NOTES AND CONDITIONS OF USE THAT ACCOMPANY THIS MAP.

Legend

0.1% Fluvial AEP Flood Depth

- 0 - 0.25m
- 0.25 - 0.5m
- 0.5 - 1m
- 1.0 - 1.5m
- 1.5 - 2m
- >2m

Modelled River Centreline

AFA Extents

FINAL

REV:	NOTE:	DATE:

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RPS

The Office of Public Works
Jonathan Swift Street
Trim
Co Meath

Elmwood House
74 Boucher Road
Belfast
BT12 6RZ

T +44(0) 28 90 667914
F +44(0) 28 90 668286
W www.rpsgroup.com
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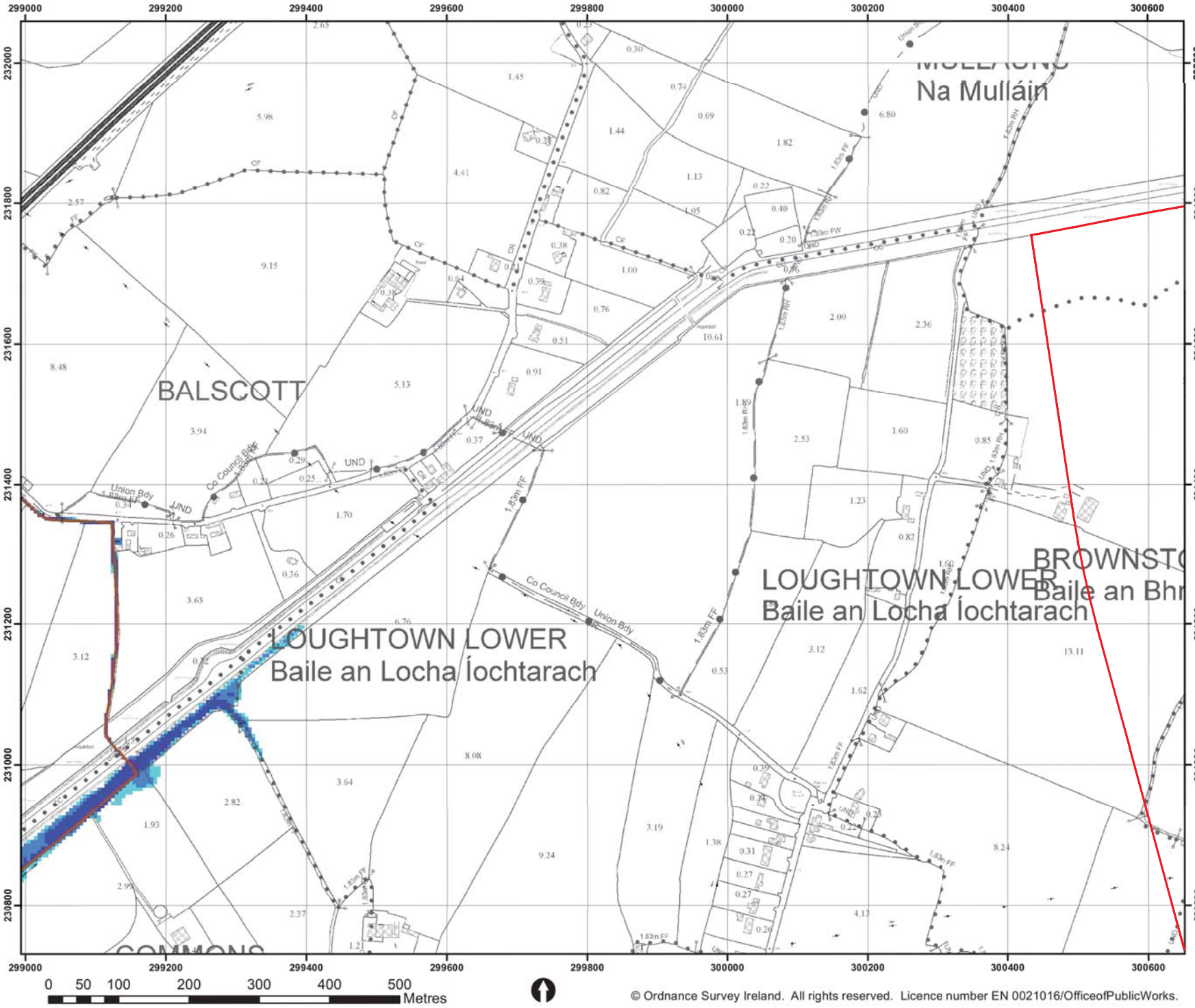
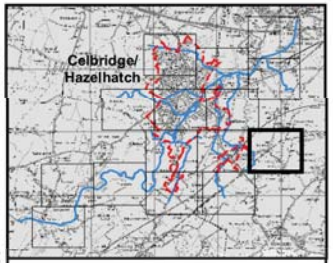
Map:	Hazelhatch Fluvial Flood Depths
Map Type:	DEPTH
Source:	FLUVIAL
Map Area:	HPW
Scenario:	CURRENT
Drawn By :	C.C. Date : 29 July 2016
Checked By :	S.P. Date : 29 July 2016
Approved By :	G.G. Date : 29 July 2016
Drawing No. :	E09CEL_DPFCD001_F0_13
Map Series :	Page 13 of 15
Drawing Scale :	1:5,000 @ A3





IMPORTANT USER NOTE:
THE VIEWER OF THIS MAP SHOULD REFER TO THE DISCLAIMER, GUIDANCE NOTES AND CONDITIONS OF USE THAT ACCOMPANY THIS MAP.

Legend

1% Fluvial AEP Flood Depth

- 0 - 0.25m
- 0.25 - 0.5m
- 0.5 - 1m
- 1.0 - 1.5m
- 1.5 - 2m
- >2m

Modelled River Centreline

AFA Extents

FINAL

REV:	NOTE:	DATE:

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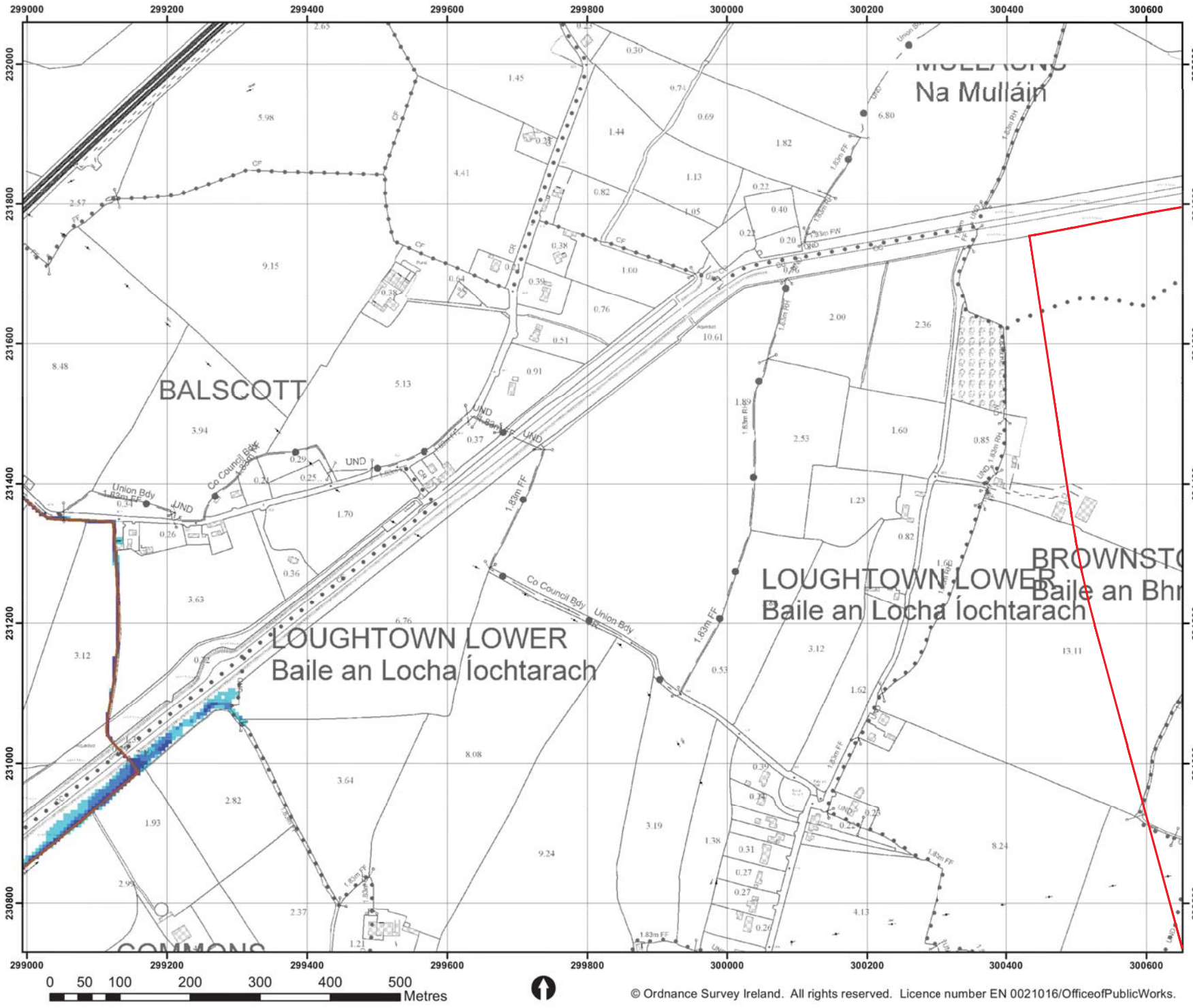
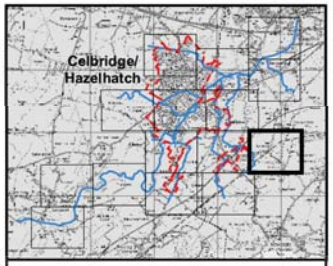
The Office of Public Works
Jonathan Swift Street
Trim
Co Meath

Elmwood House
74 Boucher Road
Belfast
BT12 6RZ

T +44(0) 28 90 667914
F +44(0) 28 90 668286
W www.rpsgroup.com
E ireland@rpsgroup.com

Map:	Hazelhatch Fluvial Flood Depths
Map Type:	DEPTH
Source:	FLUVIAL
Map Area:	HPW
Scenario:	CURRENT
Drawn By :	C.C. Date : 29 July 2016
Checked By :	S.P. Date : 29 July 2016
Approved By :	G.G. Date : 29 July 2016
Drawing No. :	E09CEL_DPFCD010_F0_13
Map Series :	Page 13 of 15
Drawing Scale :	1:5,000 @A3





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 Flood Depth

- 0 - 0.25m
- 0.25 - 0.5m
- 0.5 - 1m
- 1.0 - 1.5m
- 1.5 - 2m
- >2m

Modelled River Centreline

AFA Extents

FINAL

REV:	NOTE:	DATE:

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74 Boucher Road
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BT12 6RZ

T +44(0) 28 90 667914
F +44(0) 28 90 668286
W www.rpsgroup.com
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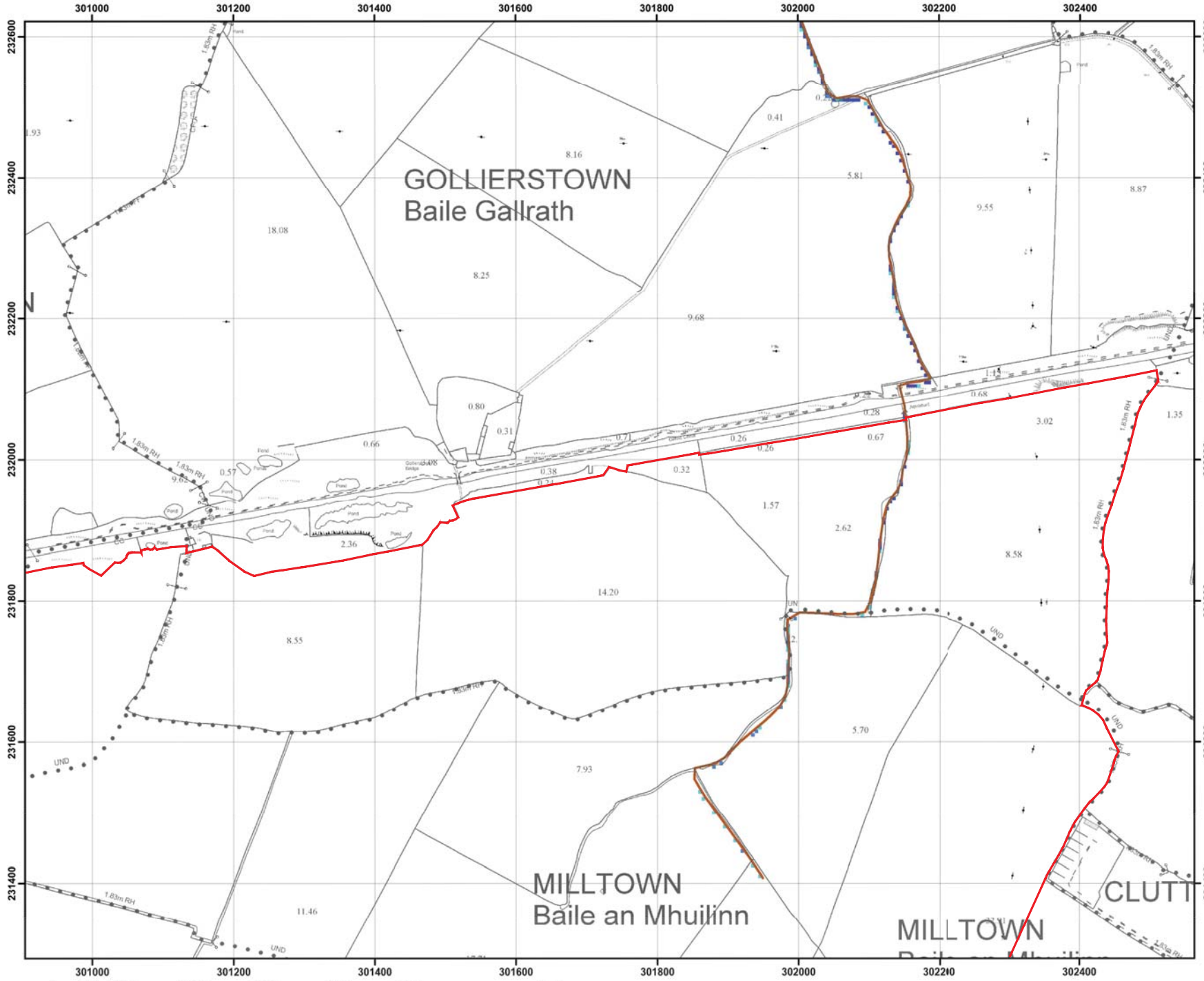
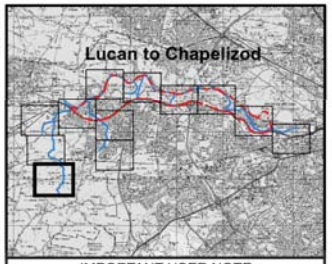
Map:	Hazelhatch Fluvial Flood Depths
Map Type:	DEPTH
Source:	FLUVIAL
Map Area:	HPW
Scenario:	CURRENT
Drawn By :	C.C. Date : 29 July 2016
Checked By :	S.P. Date : 29 July 2016
Approved By :	G.G. Date : 29 July 2016
Drawing No. :	E09CEL_DPFCD100_F0_13
Map Series :	Page 13 of 15
Drawing Scale :	1:5,000 @ A3





IMPORTANT USER NOTE:
THE VIEWER OF THIS MAP SHOULD REFER TO THE DISCLAIMER, GUIDANCE NOTES AND CONDITIONS OF USE THAT ACCOMPANY THIS MAP.

Legend

0.1% Fluvial AEP Flood Depth

- 0 - 0.25m
- 0.25 - 0.5m
- 0.5 - 1m
- 1.0 - 1.5m
- 1.5 - 2m
- >2m
- Modelled River Centreline
- AFA Extents

FINAL

REV:	NOTE:	DATE:

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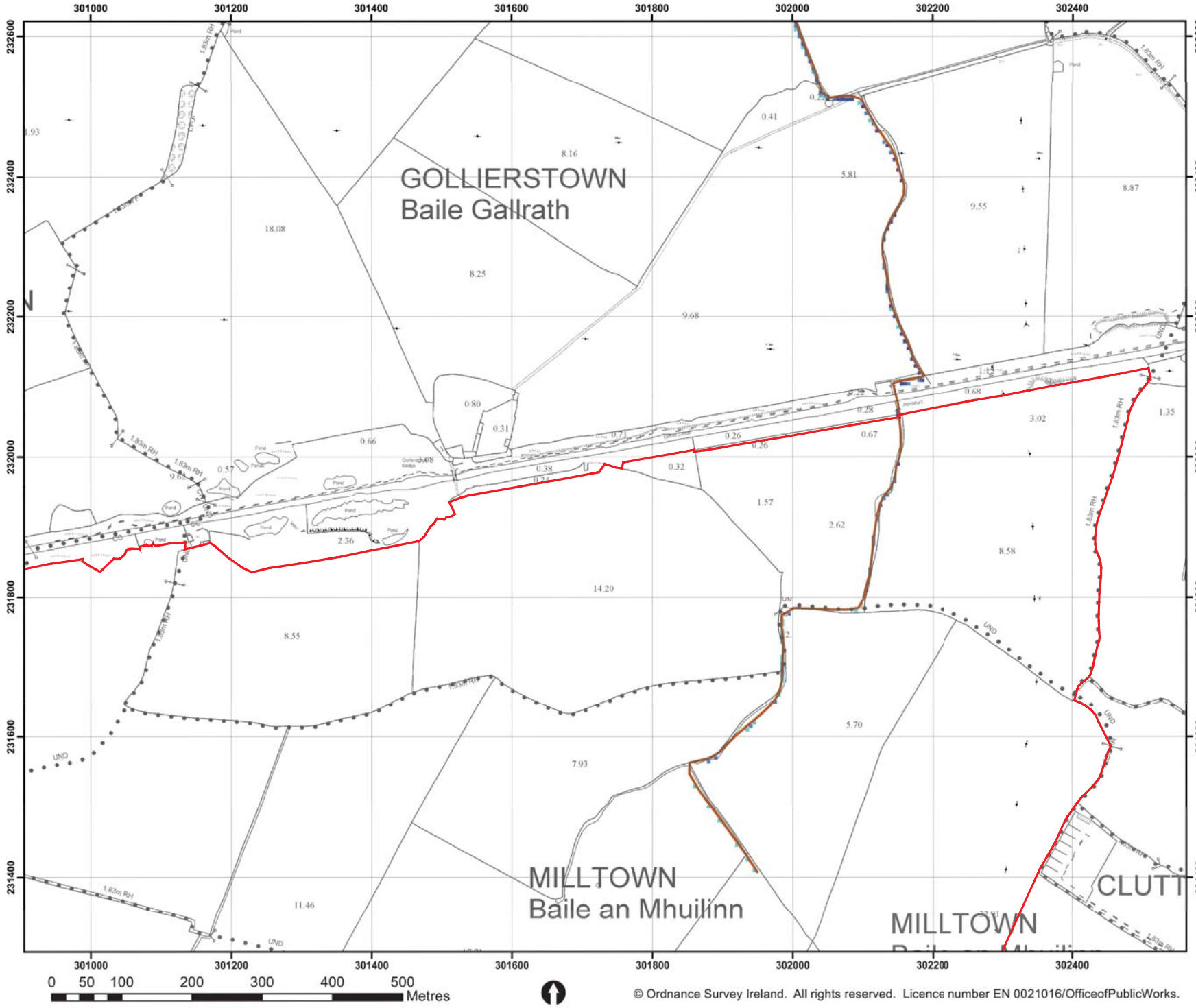
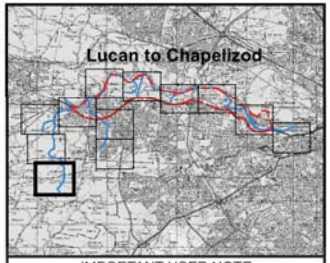
The Office of Public Works
Jonathan Swift Street
Trim
Co Meath

RPS
Elmwood House
74 Boucher Road
Belfast
BT12 6RZ
T +44(0) 28 90 667914
F +44(0) 28 90 668286
W www.rpsgroup.com
E ireland@rpsgroup.com

Map:	Lucan to Chapelizod Fluvial Flood Depths
Map Type:	DEPTH
Source:	FLUVIAL
Map Area:	HPW
Scenario:	CURRENT
Drawn By :	C.McG. Date : 28 July 2016
Checked By :	S.P. Date : 28 July 2016
Approved By :	G.G. Date : 28 July 2016
Drawing No. :	E09LUC_DPFCD001_F0_01
Map Series :	Page 1 of 12
Drawing Scale :	1:5,000 @ A3





IMPORTANT USER NOTE:
THE VIEWER OF THIS MAP SHOULD REFER TO THE DISCLAIMER, GUIDANCE NOTES AND CONDITIONS OF USE THAT ACCOMPANY THIS MAP.

Legend

1% Fluvial AEP Flood Depth

- 0 - 0.25m
- 0.25 - 0.5m
- 0.5 - 1m
- 1.0 - 1.5m
- 1.5 - 2m
- >2m
- Modelled River Centreline
- AFA Extents

FINAL

REV:	NOTE:	DATE:

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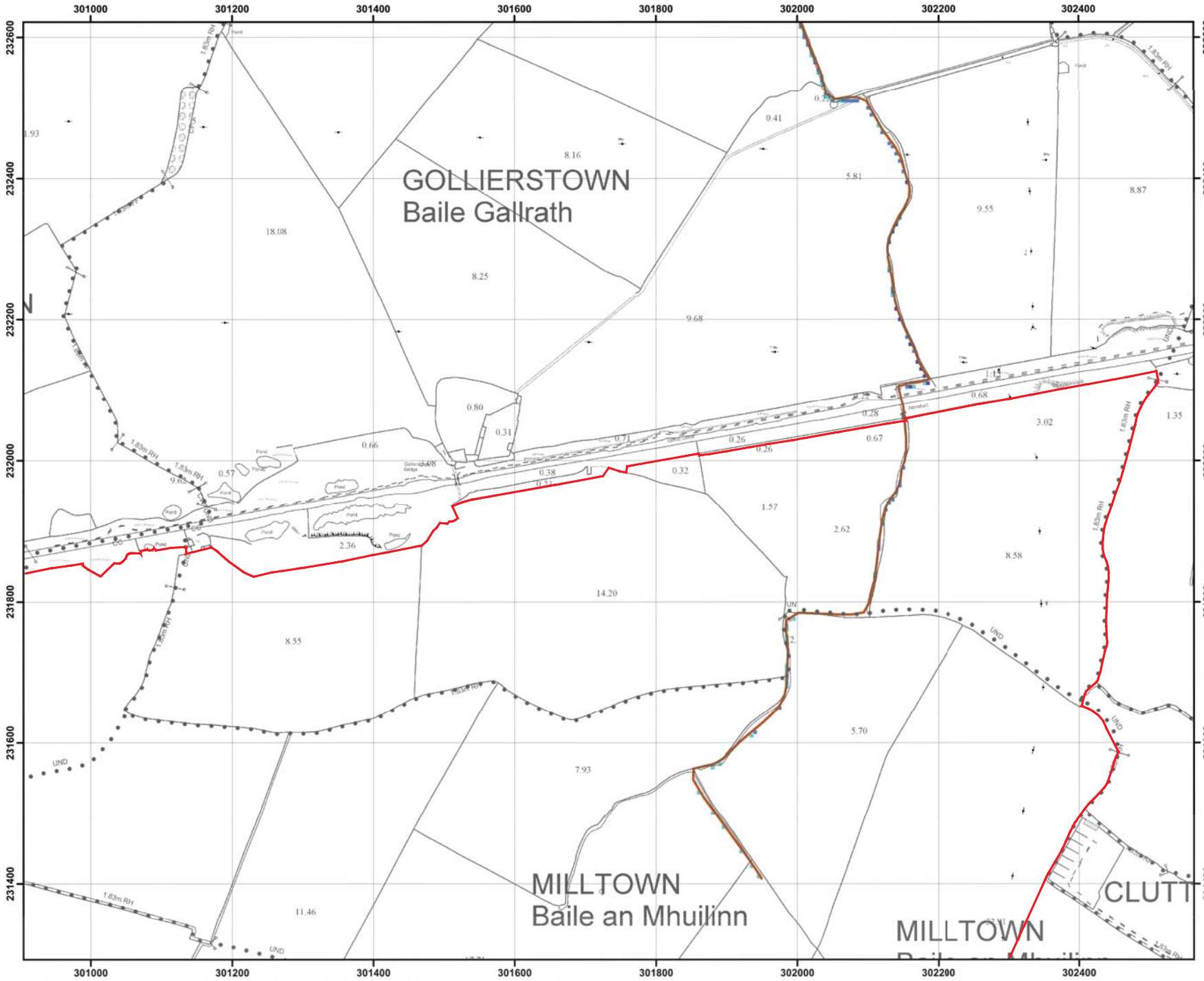
RPS

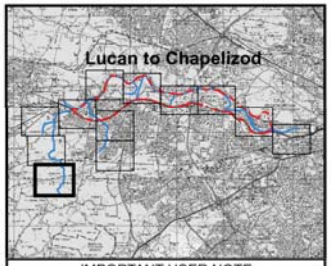
The Office of Public Works
Jonathan Swift Street
Trim
Co Meath

Elmwood House
74 Boucher Road
Belfast
BT12 6RZ

T +44(0) 28 90 667914
F +44(0) 28 90 668286
W www.rpsgroup.com
E ireland@rpsgroup.com

Map:	Lucan to Chapelizod Fluvial Flood Depths
Map Type:	DEPTH
Source:	FLUVIAL
Map Area:	HPW
Scenario:	CURRENT
Drawn By :	C.McG. Date : 28 July 2016
Checked By :	S.P. Date : 28 July 2016
Approved By :	G.G. Date : 28 July 2016
Drawing No. :	E09LUC_DPFCD010_F0_01
Map Series :	Page 1 of 12
Drawing Scale :	1:5,000 @A3





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 Flood Depth

- 0 - 0.25m
- 0.25 - 0.5m
- 0.5 - 1m
- 1.0 - 1.5m
- 1.5 - 2m
- >2m
- Modelled River Centreline
- AFA Extents

FINAL

REV:	NOTE:	DATE:

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RPS

The Office of Public Works
Jonathan Swift Street
Trim
Co Meath

Elmwood House
74 Boucher Road
Belfast
BT12 6RZ

T +44(0) 28 90 667914
F +44(0) 28 90 668286
W www.rpsgroup.com
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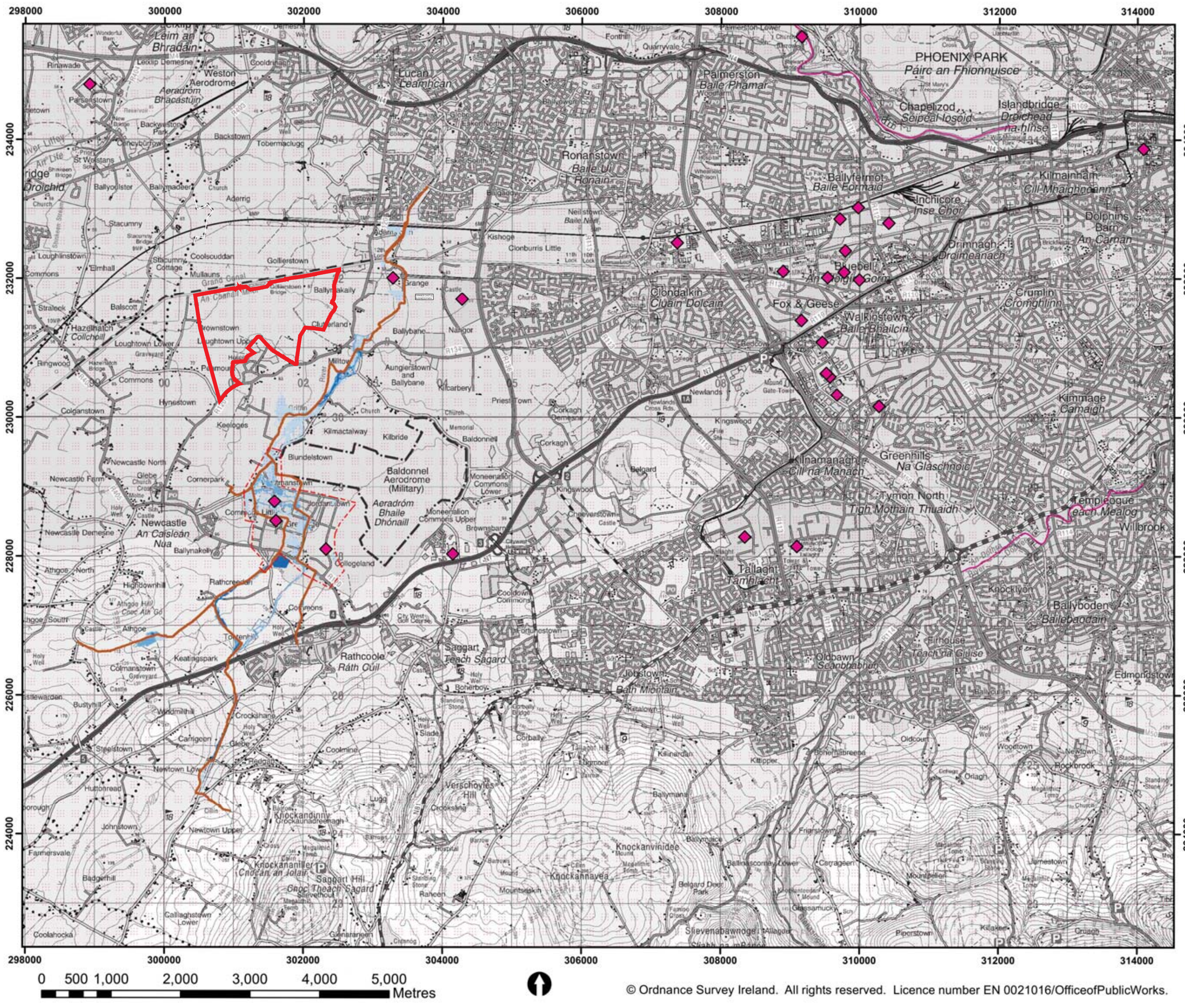
Map:	Lucan to Chapelizod Fluvial Flood Depths
Map Type:	DEPTH
Source:	FLUVIAL
Map Area:	HPW
Scenario:	CURRENT
Drawn By :	C.McG. Date : 28 July 2016
Checked By :	S.P. Date : 28 July 2016
Approved By :	G.G. Date : 28 July 2016
Drawing No. :	E09LUC_DPFCD100_F0_01
Map Series :	Page 1 of 12
Drawing Scale :	1:5,000 @A3

Appendix H



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
- IED Sites
- Designated for Drinking Water Abstraction
- Designated for Drinking Water Abstraction
- Recreational Waters
- SAC Water Dependent
- SAC Water Dependent
- SAC Water Dependent
- SPA Water Dependent
- Modelled River Centreline
- AFA Extent

FINAL

REV:	NOTE:	DATE:

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The Office of Public Works
Jonathan Swift Street
Trim
Co Meath

Elmwood House
74 Boucher Road
Belfast
BT12 6RZ
T +44(0) 28 90 667914
F +44(0) 28 90 668286
W www.rpsgroup.com
E ireland@rpsgroup.com

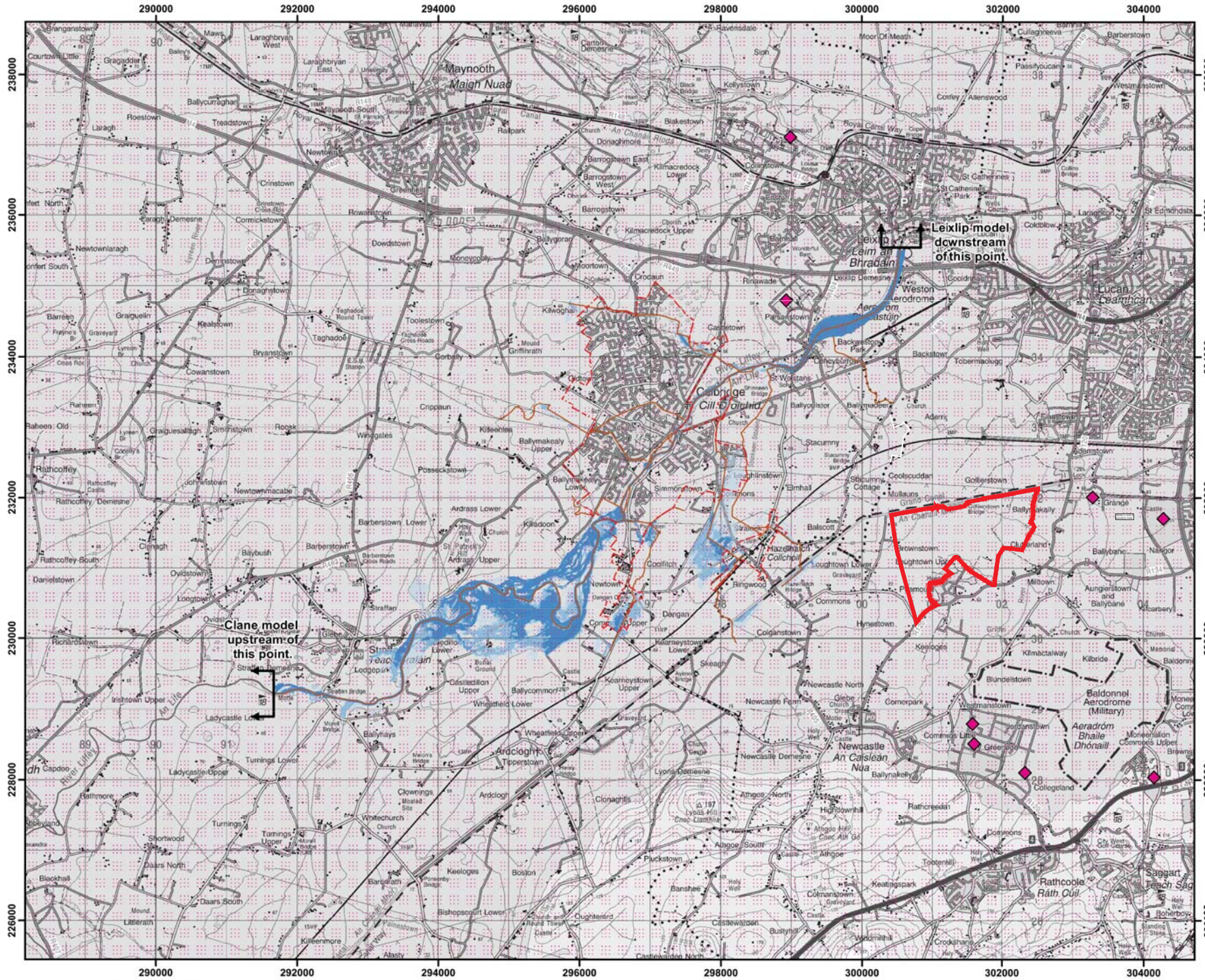
Map:
Baldonnell Risk to Environment Map

Map Type:	GENERAL RISK - ENVIRONMENT
Source:	FLUVIAL
Map Area:	HPW
Scenario:	CURRENT
Drawn By :	F.M.C. Date : 26 July 2016
Checked By :	D.I. Date : 26 July 2016
Approved By :	S.P. Date : 26 July 2016

Drawing No. :
E09BAL_RVFCD_F0_01

Map Series : Page 1 of 1

Drawing Scale : 1:50,000 @ A3



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
- IED Sites
- Designated for Drinking Water Abstraction
- Designated for Drinking Water Abstraction
- Recreational Waters
- SAC Water Dependent
- SAC Water Dependent
- SAC Water Dependent
- SPA Water Dependent
- Modelled River Centreline
- AFA Extent

FINAL

REV:	NOTE:	DATE:

EASTERN CFRAM STUDY

OPW

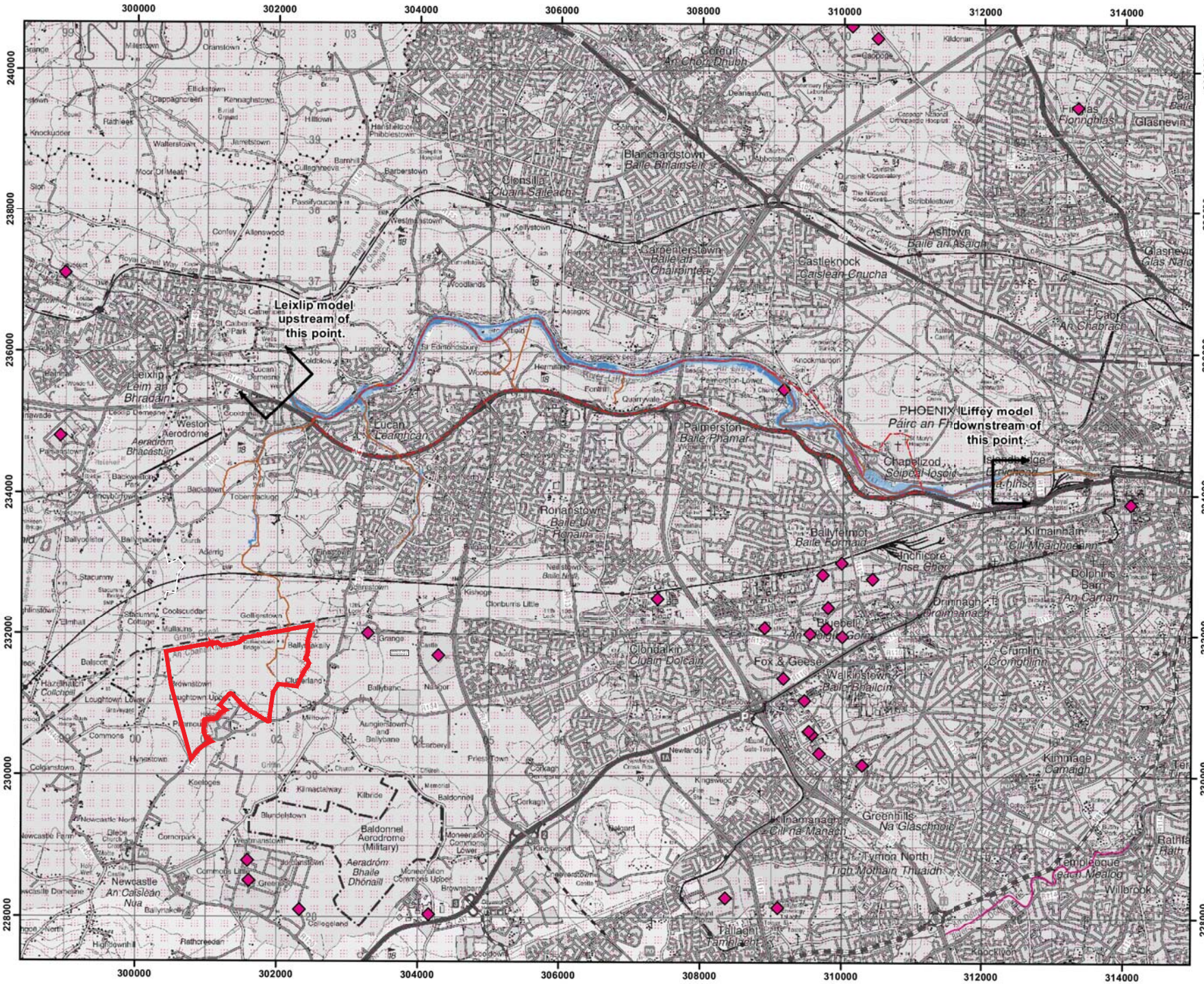
RPS

The Office of Public Works
Jonathan Swift Street
Trim
Co Meath

Elmwood House
74 Boucher Road
Belfast
BT12 6RZ

T +44(0) 28 90 667914
F +44(0) 28 90 668286
W www.rpsgroup.com
E ireland@rpsgroup.com

Map:	Celbridge/Hazelhatch Risk to Environment Map
Map Type:	GENERAL RISK - ENVIRONMENT
Source:	FLUVIAL
Map Area:	HPW
Scenario:	CURRENT
Drawn By : C.C.	Date : 29 July 2016
Checked By : S.P.	Date : 29 July 2016
Approved By : G.G.	Date : 29 July 2016
Drawing No. :	E09CEL_RVFCD_F0_01
Map Series :	Page 1 of 1
Drawing Scale :	1:50,000 @ A3



IMPORTANT USER NOTE:
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Legend

- 10% Fluvial AEP Event
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FINAL

REV:	NOTE:	DATE:

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OPW
RPS
The Office of Public Works
Jonathan Swift Street
Trim
Co Meath
Elmwood House
74 Boucher Road
Belfast
BT12 6RZ
T +44(0) 28 90 667914
F +44(0) 28 90 668286
W www.rpsgroup.com
E ireland@rpsgroup.com

Map:	Lucan to Chapelizod Risk to Environment Map
Map Type:	GENERAL RISK - ENVIRONMENT
Source:	FLUVIAL
Map Area:	HPW
Scenario:	CURRENT
Drawn By :	C.C. Date : 28 July 2016
Checked By :	S.P. Date : 28 July 2016
Approved By :	G.G. Date : 28 July 2016
Drawing No. :	E09LUC_RVFCD_F0_01
Map Series :	Page 1 of 1
Drawing Scale :	1:50,000 @ A3