Downes associates
Consulting Structural & Civil Engineers
Cashel Business Centre. Cashel Road. Kimmage. Dublin 12
T 01 4901611 / F 01 4901651 / E admin@downesassociates.ie / www.downesassociates.ie

21019

PROPOSED DWELLING AT No. 46A Limekiln Road, Walkinstown, Dublin 12

July 2021

Prepared For:
Mr. John McWeeney

Revision Register

Revision	Description	Prepared By	Checked By	Date
0	Issued for Planning	IC	LK	11.07.22
1	Issued for Planning	IC	LK	06.09.22
2	Minor adjustments	IC	LK	12.09.22

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INTRODUCTION

It is proposed by our clients, to construct a new dwelling within the greenspace beside No. 46 Limekiln Road, Walkingstown Dublin 12. The project comprises the construction of a new two-storey residential property. The site is a vacant green field at present. The site is bounded to the North by Limekiln Road, to the South by the River Poddle and to the West and East by existing residential properties, No. 46 and 44 respectively.

The following report details the proposals for water services associated with the development and includes a site specific flood risk assessment prepared by Punch Consulting Engineers within Appendix A.

Figure 1- Proposed Site Location

EXISTING SERVICES

Following instruction to proceed on the above project, Downes Associates made initial enquiries in relation to drainage and water supply services with Irish Water and South Dublin County Council. There follows a summary of the current situation with regard to civil engineering services:

Water Supply

Record maps of the existing watermains in the immediate area indicate a 100mm diameter cast iron watermain (1954) along both sides of Limekiln Road.

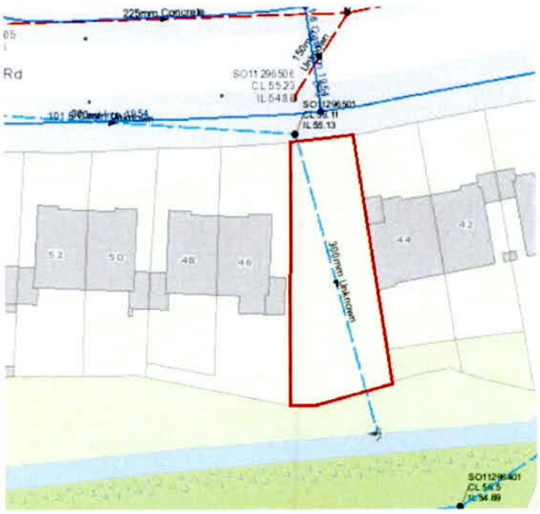

Figure 2- IW Record Mapping

Foul Drainage

A 225mm diameter public concrete foul sewer runs along Limekiln Road from West to East. An existing public foul manhole exists just outside the proposed site providing an ideal connection location. This manhole has a cover level of 55.230mOD and an invert level of 54.800mOD. A private foul sewer also exists within the greenspace as indicated on Downes Associates drawings. This private sewer will be locally diverted as part of the works. Details of same are included on Downes Associates drawings.

A previous planning application was granted for this particular site and the diversion of this private foul water sewer was approved previously under planning register reference SD07A/0710.

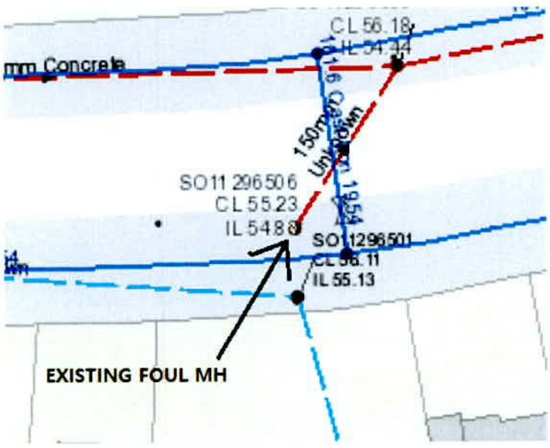

Figure 3- IW Record Mapping

Surface Water

An existing 300mm diameter surface water sewer currently traverses the site. This appears to fall by gravity to the River Poddle at a gradient of approximately 1:100. It is proposed to divert this surface water sewer as part of the works. The diameter, gradient and existing outfall level will all match the existing.

A previous planning application was granted for this particular site and the diversion of this surface water sewer was approved previously under planning register reference SD07A/0710.

Figure 4- Stormwater Sewer across site

PROPOSED SERVICES

WATER SUPPLY

The permanent water supply solution is indicated on enclosed Downes Associates drawings.

Water Requirements

Potable Water

Potable water is required for human consumption within the development. An estimate of the water requirement is 225 litres/head/day within the dwelling. Based on population equivalents of 6, the water requirement is 1,350 litres per day.

Water Supply Source

Connection to Potable Water Supply

A new local 25mm connection will serve the dwelling and will comply with the requirements of Irish Water. This will be supplied from the existing 100mm diameter cast iron watermain along Limekiln Road. A new water meter will be provided as per the requirements of Irish Water.

Irish Water

Downes Associates issued a Pre-Connection Enquiry to Irish Water on 19 May 2021. Irish Water responded with confirmation of feasibility to connect on 03 September 2021.

FOUL DRAINAGE

The permanent foul drainage solution is indicated on enclosed Downes Associates drawings.

Irish Water

Downes Associates issued a Pre-Connection Enquiry to Irish Water on 19 May 2021. Irish Water responded with confirmation of feasibility to connect on 03 September 2021.

Collection and Discharge

Foul water will leave the new dwelling via a new network of underground pipes and fall by gravity via new connection to the existing foul manhole just to the North of the site on Limekiln Road.

The foul water drainage system for the proposed development will be separate to the surface water drainage system.

Pipe Design

Pipes carrying foul sewage shall be designed to carry a peak flow of 6 times average foul sewage flow (6DWF). Average flow is taken as 225 litres/head/day for the population equivalent of 6. A roughness coefficient, ks of 1.5mm is used for foul sewers. Foul drains are designed to achieve a minimum self-cleansing velocity of 0.8m/s when flowing half full.

Therefore, maximum peak foul discharge to public sewer =

(6x225x6)/ (24x60x60) = 0.095 l/s

Using a 100mm diameter sewer at a gradient of approximately 1:60

Hydriatic performance with ks = 1.5

Full bore condition:

Discharge capacity = 6.75 l/s (>0.095 l/s)

Velocity = 0.859 m/s (>0.8 m/s)

The existing 150mm diameter private foul sewer will be locally diverted as indicated on our drawings. The existing diameter and gradient will be maintained.

SURFACE WATER DRAINAGE

The permanent surface water drainage solution is indicated on enclosed Downes Associates drawings. The proposals were discussed in principle with Mr. Brian Harkin of South Dublin County Council prior to submission and are based on the permission previously granted for this same site under planning register reference SD07A/0710.

Collection and Treatment

Surface water will be collected from the building roofs by gutters, downpipes and underground surface water pipes. Paved surfaces will generally comprise permeable construction to allow direct infiltration to ground. The surface water drainage system for the proposed development will be separate to the foul water drainage system.

Permeable surfacing is proposed for use in the front driveway area. The layers of stone and geotextile act as a type of trickle filter. Organic matter, silt and loam is caught by the geotextile and held within the laying course. Heavy metals have an affinity to particulates; adhering to the surface of the organic matter and silt. They are therefore stabilised and retained within the sub-base. Hydrocarbons are digested within the sub-base by a population of naturally occurring microbes. Research undertaken at Coventry University on microbial growth has shown that the system is capable of degrading at least 70g of oil per m^2 per annum. As a result, a petrol interceptor is not proposed.

As noted above, the existing stormwater sewer is to be diverted as shown on the attached drawings. It is important to note that the diameter and gradient of the existing stormwater sewer will be maintained. The existing sewer discharges to the river and this will be maintained also. A new non return valve will be introduced to greatly improve the situation and a wayleave will be provided as part of the proposal.

Refer to a later sub-section for details of SUDS measures adopted. The collection system is shown on the enclosed drawings.

Pipe Design

Pipes carrying surface water within the site shall be sized to cater for a rainfall intensity of 50mm per hour applied to all impermeable roofs. Surface water runoff from impermeable areas is calculated using the Modified Rational Method as follows:

$Q = 2.78C_vC_riA$ (where Q is in l/s, i is in mm/hr and A is in Ha)

$A = 131m^2 = 0.0131Ha$ – Roof contributing area (*25% of roof will comprise green roof also*)

$C_v = 0.75$ and $C_r = 1.3$

$Q = 2.78iA$

$Q_{max} = 1.82$ l/s

A roughness coefficient, k_s of 0.6mm is used for surface water drains. Pipe size and gradient for each run are determined using the Wallingford hydraulic design tables.

Using a 150mm diameter sewer at a gradient of approximately 1:200

Hydriatic performance with ks = 0.6

Full bore condition:

Discharge capacity = 14 l/s (>1.82 l/s)

Velocity = 0.82 m/s

Sustainable Surface Water Drainage Measures

The proposed surface water drainage system has been designed in accordance with the policy requirements of the Greater Dublin Strategic Drainage Study (GDSDS), incorporating surface water source control measures and Sustainable Drainage Systems (SuDS).

The proposed use of SuDS is based on detailed consideration of the following criteria:

- Technical Guidance Documents for the "Greater Dublin Strategic Drainage Study Regional Drainage Policies" (GDSDS);
- Engineering guidelines contained in CIRIA Document CIRIA C753 – The SuDS Manual
- Restrictions of the development site in terms of location, context, size, ground conditions and topography;
- Management issues relating to the adoption and operation of SuDS;

In general terms, SuDs measures shall comply with the following principles:

- Achieve adequate water quality treatment.
- Minimise runoff volumes and rates.
- Treat appropriately the stormwater effluent prior to discharge to receiving environment.
- Protect groundwater.
- Maximise amenity potential and ecological benefits where possible.

A detailed SuDS evaluation of the site was carried out including use of the design tools available on the website www.irishsuds.com.

Based on the constraints of the site, the SuDs components considered implementable in this instance are as follows:

- Permeable pavements
- Direct Infiltration
- Green roofs

Source Controls

Maximise permeability within a site to promote attenuation, treatment and infiltration reducing the need for offsite conveyance.

Ref	Measure	Suitable	Comment	Adopted
A.1	Green roofs	Yes	Green roof has been provided on the flat section of roof which measures approximately 30m sq.	Yes
A.2	Permeable paving	Yes	Permeable surface throughout	Yes
A.3	Grass	Yes	It is proposed to maintain the maximum grassed and planted area coverage for the site	Yes
A.4	Reinforced grass	No	Not suitable in domestic.	No
A.5	Gravelled areas	Yes	Permeable surfacing throughout	Yes
A.6	Rainwater harvesting	Yes	Infrastructure will be constructed allowing the adoption of such measures for gardening (non-potable) purposes only	No
A.7	RainTrap	Yes	Infrastructure will be constructed allowing the future adoption of such measures by owners.	No
A.8	Water Butt	Yes	Waterbutt provided at downpipe to rear	Yes

Swales and conveyance channels

Ref	Measure	Suitable	Comment	Adopted
B.1	Swales	No	Not suited to small scale of the site	No

Ref	Measure	Suitable	Comment	Adopted
B.2	Canals and rills	No	Not suitable to convey the surface water on this small site	No

Filtration

Ref	Measure	Suitable	Comment	Adopted
C.1	Filter trench	No	No suitable infiltration rate due to firm clays	No
C.2	Bioretention areas	Yes	The green roof will provide a bioretention function.	Yes

Infiltration

Capture surface water runoff and allow it to infiltrate (soak) and filter through to the subsoil layer, before returning it to the water table below.

Ref	Measure	Suitable	Comment	Adopted
D.1	Soakaways	No	Underlying clays have limited or no permeability.	No
D.2	Infiltration basin	No	Not considered suitable for a development of this size.	No
D.3	Rain garden	Yes	Planterbox raingarden provided to rear beneath downpipe	Yes

Retention and Detention

Designed to either provide storage, through the retention of surface water runoff, or attenuation through the detention of surface water runoff.

Ref	Measure	Suitable	Comment	Adopted
E.1	Detention basins	No	Not considered suitable for a development of this size.	No
E.2	Retention ponds	Yes	Not considered suitable for a development of this size.	No
E.3	Geocellular systems	Yes	Underground attenuation provided in conjunction with flow control device	Yes

Wetlands

Densely vegetated water bodies that use sedimentation and filtration to provide treatment of surface water runoff.

Ref	Measure	Suitable	Comment	Adopted
F.1	Wetlands	No	Not considered suitable for a development of this size.	No

Proposed Solution

A planterbox raingarden will be installed, as per the recommendations of the Raingarden Guide. (https://raingardens.info/)

The raingarden system will detain runoff from each rain event and treat this runoff in the catchment, with the growing/filter medium and stone base area acting as an infiltration and detention device. It is however proposed to provide a high-level overflow provision to the raingarden to permit discharge of runoff to the existing public surface water sewer. This is to accommodate any exceedance events for the raingarden. The overflow is provided in the catchment provided above the raingarden footprint. A perforated land drain will also be provided in a base drainage layer to ensure excess water in the planter medium is drained. The retention time promotes pollutant removal through sedimentation and the opportunity for biological uptake mechanisms to reduce nutrient concentrations. The planting will be drought and flood tolerant types. The landscape and biodiversity design will be carried out by a landscape designer for the Client. Typically, the following types of planting are suitable:

Stipia arundinacea

Carex 'evergold'

Miscanthus Yakushima Dwarf

Festuca blue fox

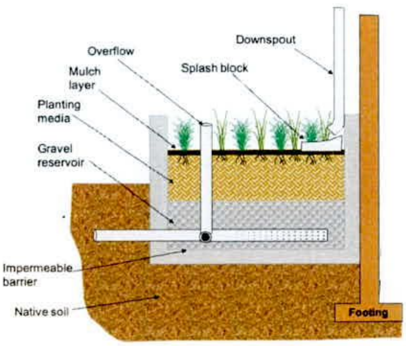

Illustration of a Planter Box

Figure 4 Exemplar Raingardens

The final filter medium will be specified at tender or construction stage, however a typical filter material specification for CIRIA C753 is noted in Figure 4 below.

Table 18.2 Example grading for a bioretention filter medium

Sieve size (mm)	% passing
6	100
2.0	90–100
0.6	40–70
0.2	5–20
0.063	< 5

The specification could also be presented as follows (which may be more relevant to landscape practitioners):

- clay and silt (< 0.063 mm) < 5%
- fine sand (0.063–0.2 mm) < 20%
- medium sand (0.2–0.6 mm) 35% to 65%
- coarse sand (0.60–2.0 mm) 50% to 60%
- fine gravel (2.0–6.0 mm) < 10%

The filter medium should be well-graded, and the composition should contain limited particle size range.

Organic matter content

Organic matter content should be 3–5% (w/w).

pH

pH should be 5.5–8.5 (1:2.5 soil/water extract)

Electrical conductivity (salinity)

Electrical conductivity (EC) should be < 3300 μS/cm (1:2.5 soil/$CaSO_4$ extract)

Major plant nutrients

Total nitrogen should be 0.10–0.30%

Extractable phosphorus should be 18–100 mg/l

Extractable potassium should be 120–900 mg/l

(Methods of analysis in accordance with BS 3882:2015, unless otherwise stated.)

Horticultural assessment

Potential bioretention soils and test results should generally be assessed by a horticulturalist to ensure that they are capable of supporting a healthy vegetation community. This assessment should take into consideration delivery of nutrients to the system by surface water runoff. Any component or soil found to contain high levels of salt (as determined by EC measurements), high levels of clay or silt particles (exceeding the particle size limits set above), or any other extremes which may be considered retardant to plant growth should be rejected.

Figure 5: Exemplar Filter Material Specification.

A green roof is provided on the flat section of roof to the rear. This will reduce entry time and encourage biodiversity. The green roof measures approximately 30m sq and is maximised in so far as possible within the proposed roof geometry.

A comprehensive stormwater modelling analysis has bee undertaken using Causeway Flow + Software. The output of same is included within the appendices of this report. A stormwater attenuation system and flow control device are proposed to restrict the ultimate outflow to the River Poddle to match that of the equivalent greenfield runoff rate. We would note however that calculating Qbar for this small site results in a rate of 0.1L/sec. The orifice required to achieve such a small flow rate would be so small that it would be easily blocked with leaves or debris. As such, we propose a realistic practical lower limit of 1.0L/sec.

FLOOD RISK MANAGEMENT

Flood Risk Assessment

Due to the proximity of the site to the river poddle a site specific flood risk assessment has been prepared by Punch Consulting Engineers. A copy of this is included within Appendix A of this report.

Punch Consulting recommend a finished floor level of 56.420 for the proposed development. This has been accounted for within the design.

SCHEDULE OF DRAWINGS

The following drawings should be read in conjunction with this report:

- 21019-LIME-DOW-00-XX-DR-CE-4000-S4-P01-Manhole Details Sheet 1 of 2
- 21019-LIME-DOW-00-XX-DR-CE-4001-S4-P01-Manhole Details Sheet 2 of 2
- 21019-LIME-DOW-00-XX-DR-CE-4002-S4-P01-Pipe Bedding Details
- 21019-LIME-DOW-00-XX-DR-CE-4003-S4-P01-Gully Details
- 21019-LIME-DOW-00-XX-DR-CE-4004-S4-P01-Paving Details
- 21019-LIME-DOW-00-XX-DR-CE-4005-S4-P01-Road Surface Details
- 21019-LIME-DOW-00-XX-DR-CE-4006-S4-P01-Pump & Headwall
- 21019-LIME-DOW-00-XX-DR-CE-4007-S4-P01-Watermain Details
- 21019-LIME-DOW-00-XX-DR-CE-5000-S4-P01 - Existing Site Survey & Water Services
- 21019-LIME-DOW-00-XX-DR-CE-5001-S4-P01 - Proposed Site Layout & Water Services
- 21019-LIME-DOW-00-XX-DR-CE-5002-S4-P01 - Proposed Drainage Longsections

APPENDIX A

FLOOD RISK ASSESSMENT – PUNCH CONSULTING ENGINEERS

PUNCH consulting engineers

214111 - 46A Limekiln Road

Site Specific Flood Risk Assessment
214111-PUNCH-XX-XX-RP-C-0001

September 2022

Document Control

Document Number: **214111-PUNCH-XX-XX-RP-C-0001**

Status	Revision	Description	Date	Prepared	Checked	Approved
A0	C01	Planning Issue	22/09/2022	C Shannon	J Tiernan	J Tiernan

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1 Introduction

1.1 Background

PUNCH Consulting Engineers were appointed by John McWeeney of 46 Limekiln Road, Walkinstown, Dublin 12 to carry out a Site-Specific Flood Risk Assessment for a proposed residential dwelling at No. 46A Limekiln Rd, Walkinstown, Dublin 12.

The assessment is carried out in full compliance with the requirements of "The Planning System & Flood Risk Management Guidelines" published by the Department of the Environment, Heritage and Local Government in November 2009. This report has been prepared following consultation with South Dublin County Council (SDCC).

The proposed site layout is detailed in a series of planning drawings provided by 20TENstudio Architects and are included in the planning documentation.

1.2 Existing Site

The site location is shown in Figure 1-1 below and is located within SDCC's remit. The proposed site is bordered by existing residential dwellings to the west and east, Limekiln Road to the north, and the River Poddle to the south. The site has an approximate area of 0.055ha and is currently a greenfield site. The topography of the site is flat with a sharp drop off at the southern boundary which runs down to the River Poddle.

Figure 1-1: Location of the Proposed development (site boundary indicated in red)

1.3 Nature of the Proposed Development

The proposed development comprises of the construction of a new residential dwelling. The works will involve the demolition of the existing garage in the neighbouring house (No. 46) to the west and the construction of a two-storey dwelling. The proposed development will be accessed from Limekiln Road. The proposed finished floor level is 56.42 mAOD. An extract from Downes Associates Drawing No. 5001 showing the proposed site layout is shown here as Figure 1-2.

Figure 1-2: Proposed Site layout

It is noted that planning permission was previously granted for a residential dwelling on this site in 2008. An Extension of Duration was granted on this planning application in 2012 (subsequent to the publication of The Planning System and Flood Risk Management Guidelines, 2009) which extended the planning permission until 2018, but has since expired (SDCC Planning Reference No. SD07A/0710/EP).

2 Relevant Guidance

2.1 The Planning System and Flood Risk Management Guidelines

In September 2008, "The Planning System and Flood Risk Management" Guidelines were published by the Department of the Environment, Heritage and Local Government in Draft Format. In November 2009, the adopted version of the document was published.

The Flood Risk Management Guidelines give guidance on flood risk and development. The guidelines recommend a precautionary approach when considering flood risk management in the planning system. The core principle of the guidelines is to adopt a flood risk sequential approach to managing flood risk and to avoid development in areas that are at risk. The sequential approach is based on the identification of flood zones for river and coastal flooding. The guidelines include definitions of Flood Zones A, B and C, as noted in Table 2-1 below. It should be noted that these do not take into account the presence of flood defences, as there remain risks of overtopping and breach of the defences.

Table 2-1: Flood Zone Designation

Flood Zone	Type of Flooding	Annual Exceedance Probability (AEP)
Flood Zone A	Coastal	Less than a 1:200 (0.5% AEP) year event
	Fluvial	Less than a 1:100 (1% AEP) year event
Flood Zone B	Coastal	Greater than a 1:200 (0.5% AEP) and less than a 1:1000 (0.1% AEP) year event
	Fluvial	Greater than a 1:100 (1% AEP) and less than a 1:1000 (0.1% AEP) year event
Flood Zone C	Coastal	Greater than a 1:1000 (0.1% AEP) year event
	Fluvial	Greater than a 1:1000 (0.1% AEP) year event

Once a flood zone has been identified, the guidelines set out the different types of development appropriate to each zone. Exceptions to the restriction of development due to potential flood risks are provided for through the use of the **Justification Test**, where the planning need and the sustainable management of flood risk to an acceptable level must be demonstrated. This recognises that there will be a need for future development in existing towns and urban centres that lie within flood risk zones, and that the avoidance of all future development in these areas would be unsustainable.

A three staged approach to undertaking an FRA is recommended:

Stage 1: Flood Risk Identification - Identification of any issues relating to the site that will require further investigation through a Flood Risk Assessment;

Stage 2: Initial Flood Risk Assessment - Involves establishment of the sources of flooding, the extent of the flood risk, potential impacts of the development and possible mitigation measures;

Stage 3: Detailed Flood Risk Assessment - Assess flood risk issues in sufficient detail to provide quantitative appraisal of potential flood risk of the development, impacts of the flooding elsewhere and the effectiveness of any proposed mitigation measures.

This report addresses the requirements for Stage 2.

2.2 SDCC Draft Development Plan 2022 - 2028

Section 13.9.1 (Water Management) of the South Dublin County Council (SDCC) Draft Development Plan 2022 - 2028 states the following with regards flood risk:

> *Flood Risk Assessment Flood risk management will be carried out in accordance with the Flood Risk Management Guidelines for Planning Authorities, DOECLG (2009) and Circular PL2/2014. The Dodder CFRAMS, Eastern CFRAMS (Catchment and Flood Risk Assessment and Management) and the South Dublin Strategic Flood Risk Assessment (2021) provide information in relation to known flood risk in South Dublin County (see Development Plan Green Infrastructure (GI) Map).*
>
> - *Development proposals on lands that may be at risk of flooding should be subject to a flood risk assessment, prepared by an appropriately qualified Chartered Engineer, in accordance with the Flood Risk Management Guidelines. Detailed flood risk assessments should be cognisant of possible pluvial flood risk and appropriate drainage proposals should be implemented to reduce the risk of pluvial flooding; and*
> - *Proposals for minor development to existing buildings (e.g. extensions or change of use) in areas of flood risk should include a flood risk assessment of appropriate detail.*

A Draft Strategic Flood Risk Assessment (SFRA) was completed for SDCC in May 2021 to supplement the SDCC Draft Development Plan 2022-2028. The objectives of the SFRA are listed as follows:

- *To undertake site specific flood risk assessments for all new developments in accordance with The Planning System and Flood Risk Management - Guidelines for Planning Authorities (2009).*
- *Ensure that future developments are designed and constructed in accordance with the "Precautionary Principle" detailed in The OPW Guidelines.*
- *To ensure that hydromorphological assessments are undertaken where proposed development is within lands which are partially or wholly within the Riparian Corridors identified as part of this Development Plan.*
- *To require development proposals that are within riparian corridors to demonstrate how the integrity of the Riparian Corridor can be maintained and enhanced having regard to flood risk management, biodiversity, ecosystem service provision, water quality and hydromorphology.*
- *To promote and protect native riparian vegetation along all watercourses and ensure that a minimum 10m vegetated riparian buffer from the top of the riverbank is maintained/reinstated along all watercourses within any development site.*

2.3 Land Zoning

The site of the proposed dwelling is currently zoned as "RES - To Protect and/or improve residential amenity" in the SDCC Draft Development Plan 2022-2028. An extract from Sheet 6 of the Use Zoning Objectives Map from the SDCC Draft Development Plan 2022-2028 is shown here as Figure 2-1.

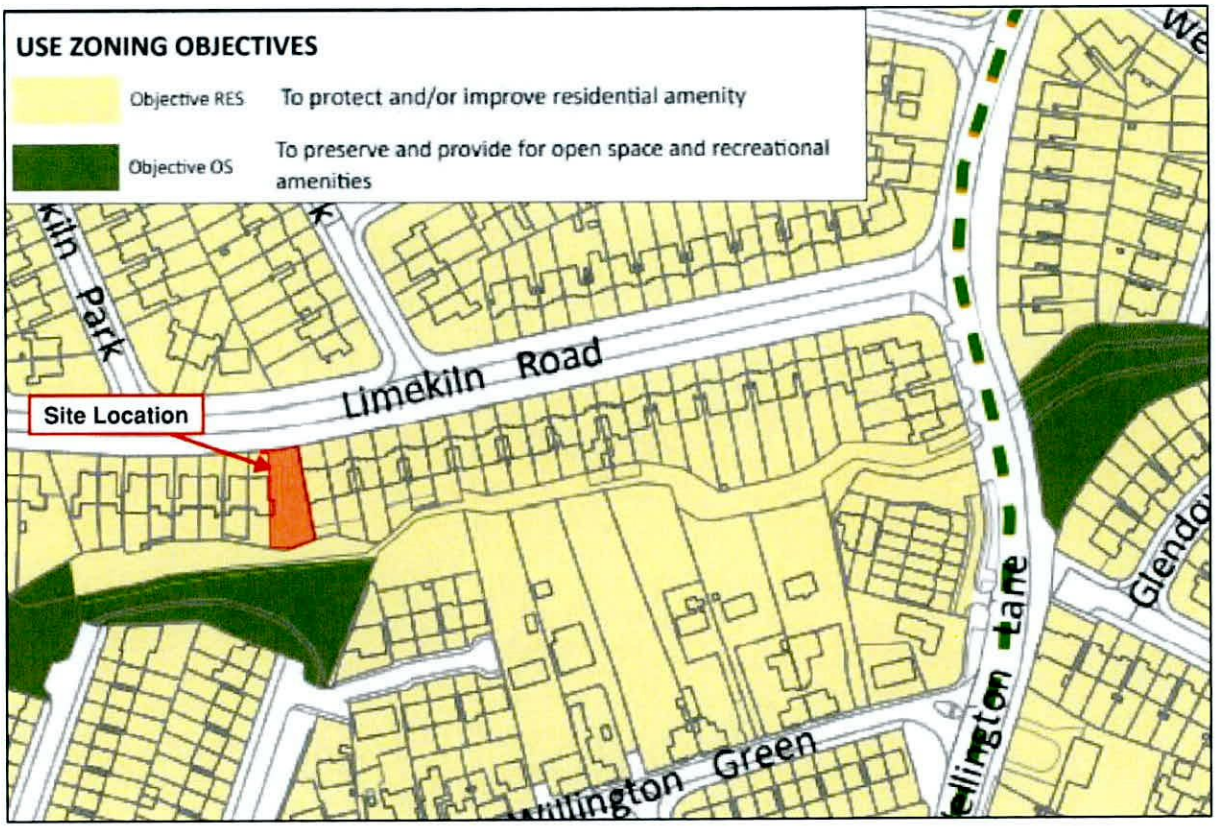


Figure 2-1: Extract from SDCC Draft Development Plan Use Zoning Objectives Map (Sheet 6)

2.4 Flood Risk Management Plan

The OPW publish Flood Risk Management Plans detailing the feasible range of flood risk management measures proposed for their respective river basins. The Flood Risk Management Plan for the Liffey and Dublin Bay Area was published by the OPW in 19/02/2018 and is valid for the period 2018-2021. The plan lists current flood management measures in place and potentially viable Flood Relief Works.

The Poddle Flood Alleviation Scheme (FAS) was initiated as part of the CFRAMS process following major fluvial flooding in 1986 and 2011. The Scheme, which includes flood defence walls, embankments and an integrated constructed wetland is designed to provide protection against the 1%AEP flood event for 921 properties, in the SDCC and Dublin City Council (DCC) local authorities' areas primarily against fluvial flooding. This scheme is currently at planning state.

Benefitting Area Maps have been prepared as part of the Poddle FAS which outline those areas which will see a reduction in flood risk following completion of the scheme. Figure 2-2 is an extract from *Benefits Area - Sheet 2* and shows the site of the proposed dwelling to be included in the benefitting areas. This scheme is currently at planning stage and works have not commenced on site.

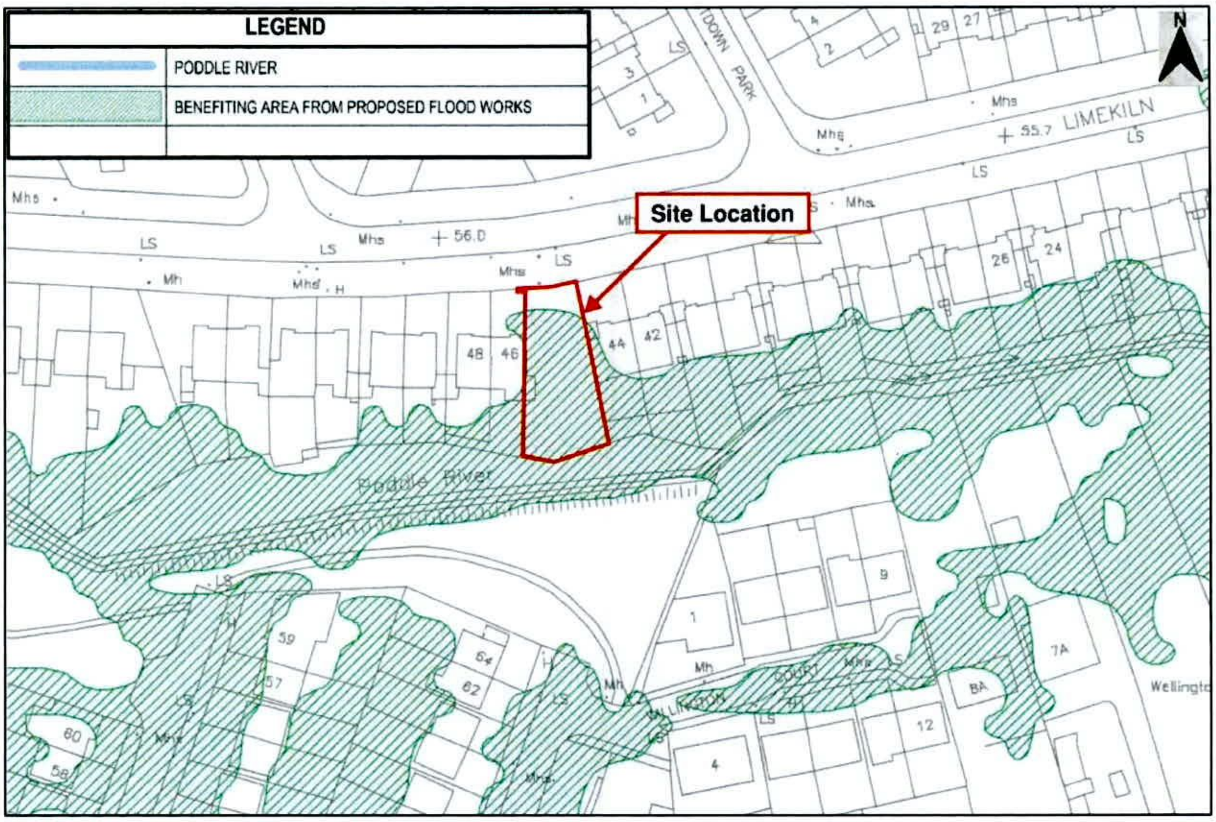


Figure 2-3: Extract from Poddle FAS Benefits Area (Sheet 2)

3 Flood Risk Identification

3.1 Existing Hydrological Environment

The existing hydrological environment is characterised primarily by the presence of the River Poddle which is located approximately 6m south of the proposed site boundary. The River flows in a easterly direction before discharging to the River Liffey in Dublin City. The site is located approximately 8 km from Dublin bay, and the River Poddle is not tidally influenced at this location. There is a pedestrian bridge across the stream approximately 120m upstream of the site. The hydrological environment around the site is shown in Figure 3-1 below.

Figure 3-1: Existing Hydrological Environment

3.2 Topographical Survey

A topographical survey of the site was supplied to PUNCH to carry out this assessment. The survey was undertaken in May 2021 by Paul Corrigan and Associates and the survey extent is shown in Figure 3-2. The topography of the site is generally flat, with ground levels ranging from 55.89 mAOD and 56.19 mAOD, with a slight dip in the middle of the site and uneven ground at the southern boundary. Ground levels to the south of the site fall sharply towards the River Poddle.

The survey has identified storm and foul water manholes outside the site on Limekiln Road. A second foul water manhole has been noted within the south-western area of the site.

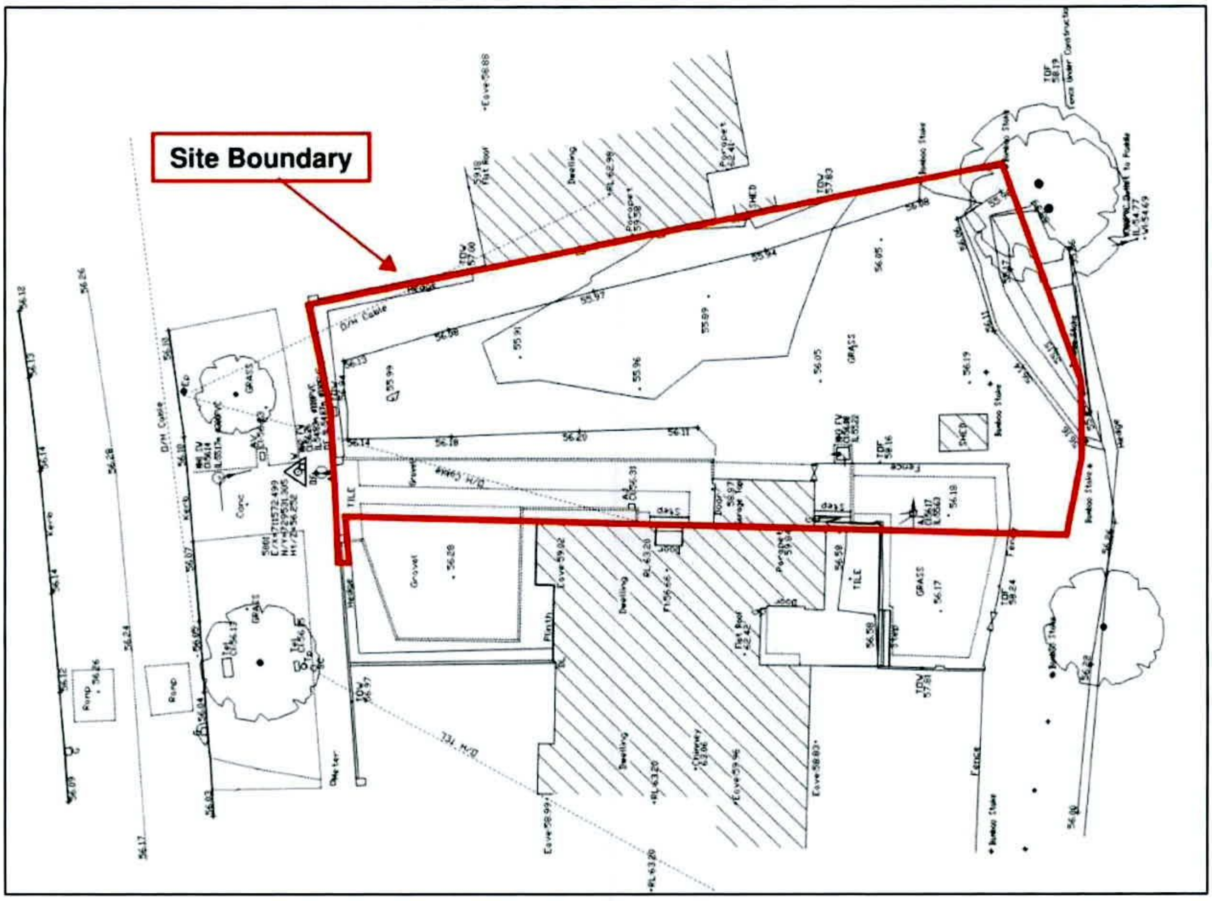


Figure 3-2: Topographical Survey Extent

3.3 Site Walkover

PUNCH Consulting Engineers visited the proposed site on the 18th of July 2022 to assess the conditions of the site. The following was noted at the time of the visit.

i. The weather at the time of the site was clear and sunny.
ii. The site is currently accessed via the vehicular access to No. 46 Limekiln Road.
iii. The site is bounded to the east by a concrete block wall, to the south by trees and hedgerows, to the west by an existing residential property and to the north by hedging.
iv. The ground conditions at the time of the visit were very dry and there was a noticeable depression across the site along the line of the existing storm water main.
v. The site is predominantly flat with an area of uneven ground adjacent to the southern boundary.
vi. The site is currently grassed and forms part of the garden of No. 46 Limekiln Road.
vii. There is an existing foul sewer manhole located adjacent to the shed of No. 46 Limekiln Road.
viii. It was not possible to access the River Poddle directly from the site and an alternative access point was found along the southern bank of the river opposite the site. The river banks were heavily vegetated at the time of visit and it was not possible to see the river itself.

Please refer to Appendix A for a selection of images from the site walkover.

3.4 Site Geology

The geology of the site was reviewed using data from the Geological Survey of Ireland (available at www.gsi.ie). The GSI quaternary map was reviewed and an extract from this map is shown in Figure 3-3. This indicates the area to be 'Till derived from limestones.'

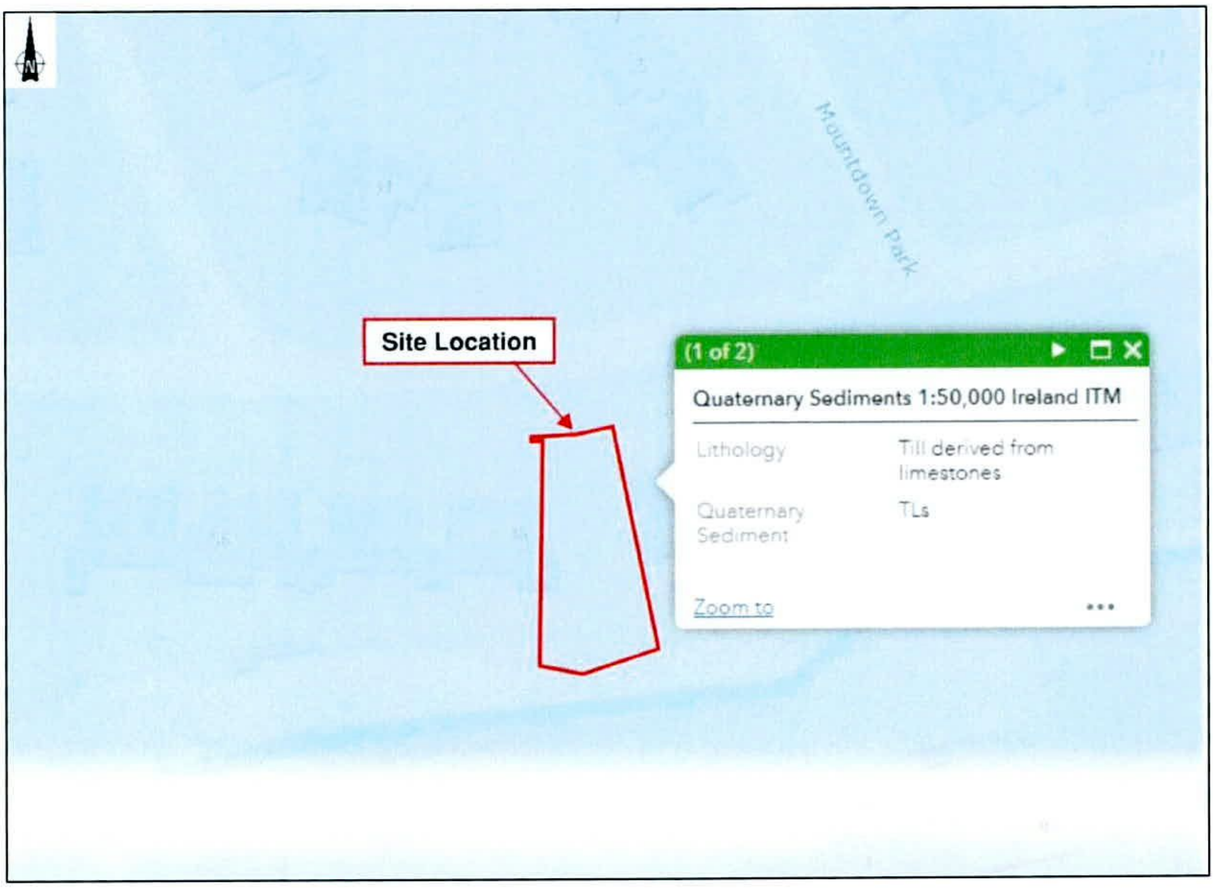


Figure 3-3: Geology of the surrounding area (source: Geological Survey of Ireland (www.gsi.ie))

3.5 Groundwater Flooding

A review of the groundwater mapping did not show a groundwater flooding risk in this area.

3.6 Review of Existing Surface Water Infrastructure

SDCC was contacted with regards to the existing surface water infrastructure in the vicinity of the site. Figure 3-4 below is an extract from the SDCC Existing Drainage Record drawing. The drawing indicates that there is a 300mm storm water pipe crossing the site and discharging into the River Poddle.

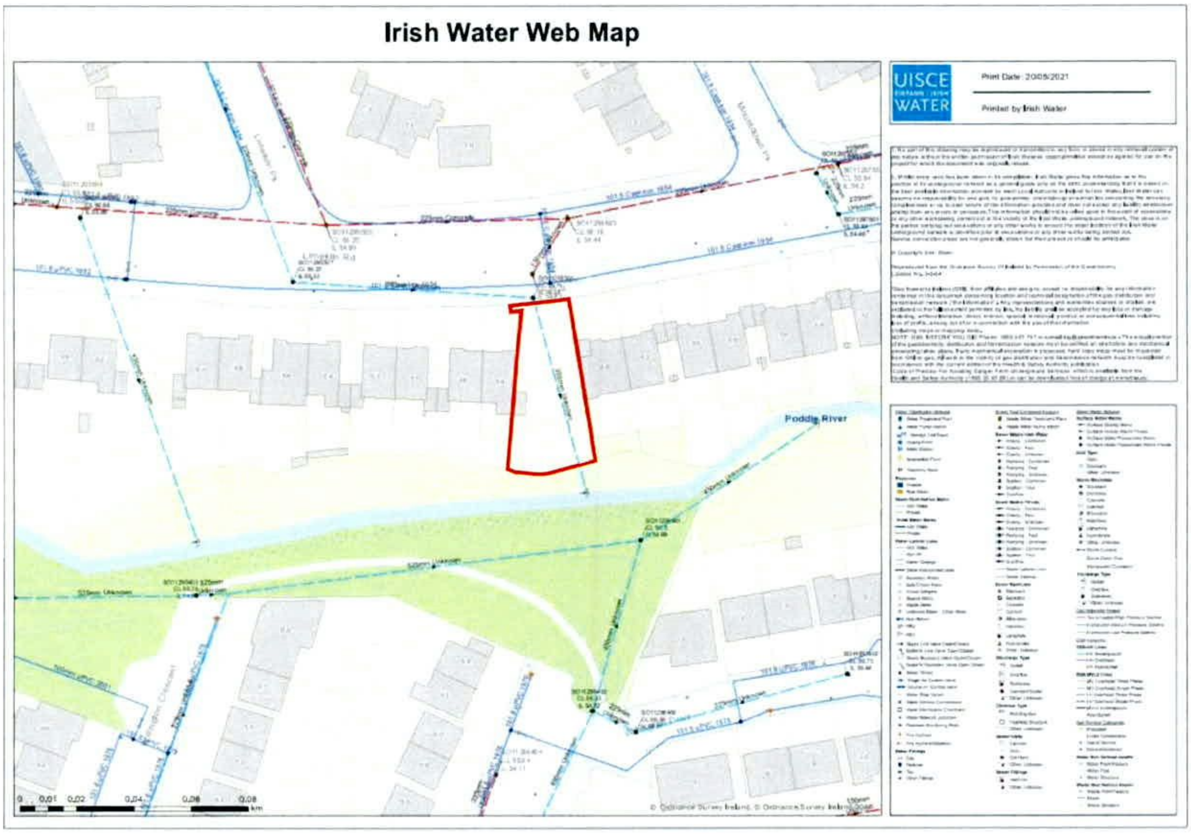


Figure 3-5: Existing Stormwater drainage in the vicinity of the site (source: South Dublin County Council)

It is proposed to reroute this surface water main within the site boundary keeping the pipe diameter, gradient and outfall level as per the existing arrangement. Figure 1-2 in this report shows the proposed location of the surface water main and further information can be found in Downes Associates Planning Report and associated drawings. This surface watermain diversion will not impact flood risk to the site.

The diversion of this surface water main was previously approved by SDCC under Planning Reference No. SD07A/0710/EP.

3.7 Review of Historic Mapping

A review of the OSI Historical maps[1] was carried out. Figure 3-6 shows an extract from the 25-inch historic map for the site. The site was not indicated as "liable to flood" in the available historic OSI maps. The historic maps indicate that the site was previously undeveloped.

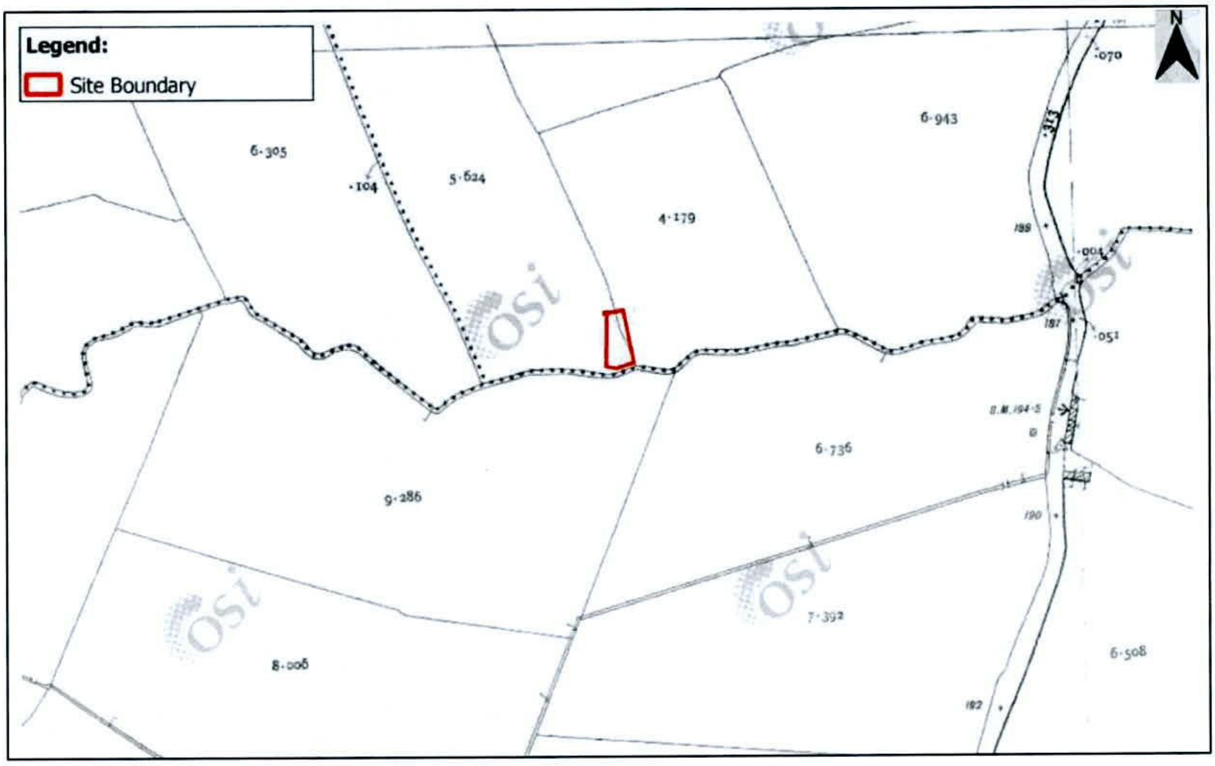


Figure 3-6: Extract from OSI historical 25-inch map

[1] Maps available: http://map.geohive.ie/mapviewer.html

3.8 History of Flooding

The Office of Public Works (OPW) Flood Hazard Mapping website holds a record of historic flood events. A review of the database indicated that there have been historical instances of flooding on Limekiln Road as shown in Figure 3-7, see Appendix B for full report. Please note that this is not a guaranteed record of all flood events.

Past Flood Event Local Area Summary Report OPW

Report Produced: 12/7/2022 12:06

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

This report has been downloaded from www.floodinfo.ie (the "**Website**"). The users should take account of the restrictions and limitations relating to the content and use of the Website that are explained in the Terms and Conditions. It is a condition of use of the Website that you agree to be bound by the disclaimer and other terms and conditions set out on the Website and to the privacy policy on the Website.

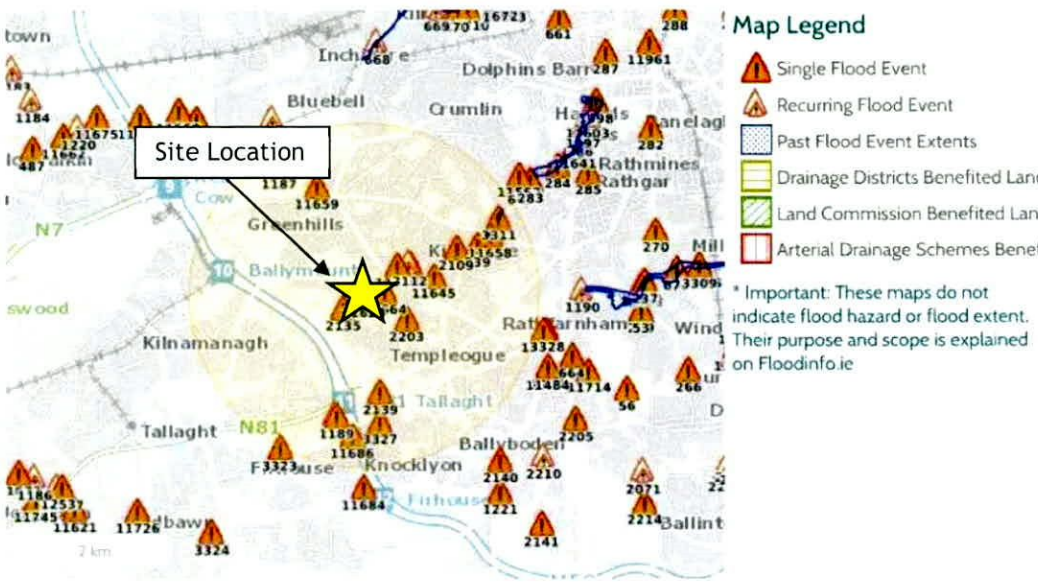


Figure 3-7: Extract from OPW Past Flood Event Summary Report

There is a record of several instances of flood events along the Poddle River, most notably the following:

Flooding at Limekiln Road

On the 24th Oct 2011, flooding occurred on the site. The source of the flood waters was overtopping of the River Poddle. Flood water came up through the drains into the front of the affected properties while the rear of the properties were protected by boundary walls. The flood depth was recorded as 0.3 meters. A report of this flooding has been included in Appendix B.

Mr. John McWeeney was the owner of the adjacent property (46 Limekiln Road) at the time of the event and notes that minor flooding occurred in the rear garden, but flood waters did not enter the property.

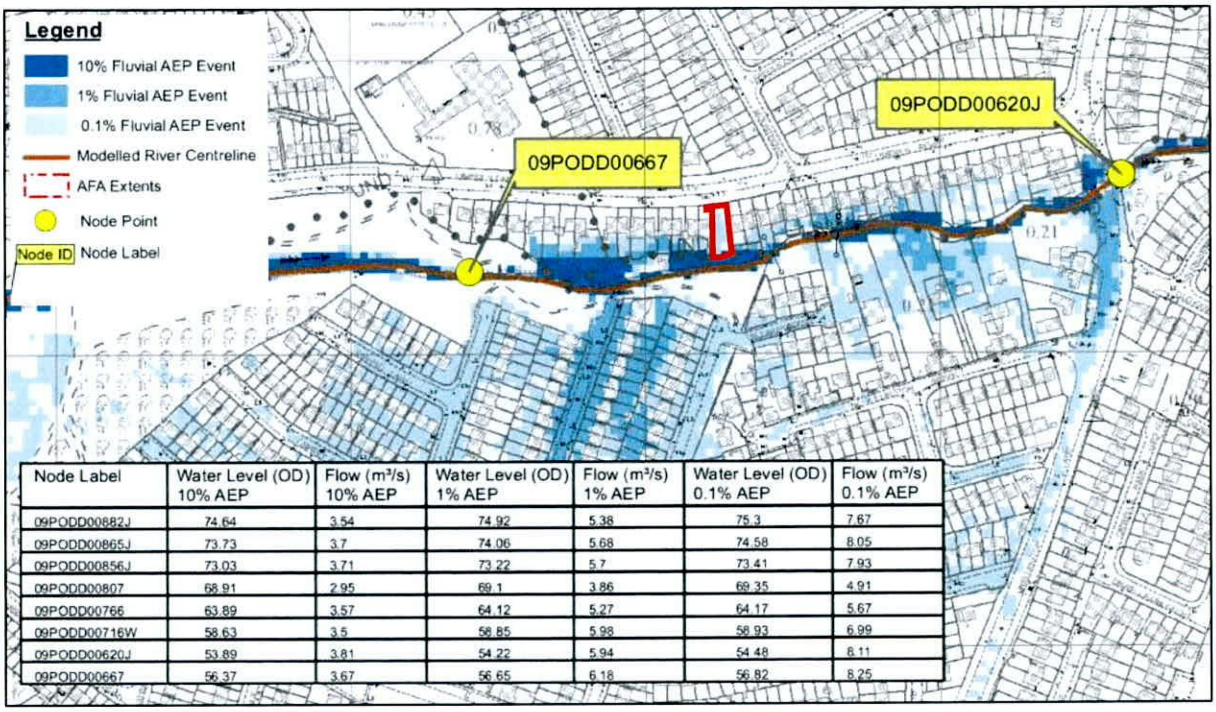
It is intended that the River Poddle FAS will alleviate the 1%AEP flood risk to this area as indicated in the Benefits Area Map, an extract of which is shown in Figure 2-3 of this report.

3.9 CFRAMS Mapping

The Catchment Flood Risk Assessment and Management Study (CFRAMS) is an OPW led national programme which seeks to identify and map potential existing and future flood hazard in areas at significant risk from flooding. It also aims to identify flood relief measures and prepare Flood Risk Management Plans for these areas.

As part of the CFRAMS programme, mapping is available online for public viewing (www.floodinfo.ie), and the local area has been assessed as part of the Eastern CFRAMS. The OPW has published detailed flood hazard mapping for the area based on results from the CFRAMS. This includes flood extent and flood depth mapping for a number of return periods for fluvial and coastal flood events. The CFRAMS assessment in this area is based on hydraulic modelling of the River Poddle.

Figure 3-8 below is an extract from the relevant Eastern CFRAMS fluvial flood extent map for the area surrounding the proposed development site. Figure 3-9 shows the same site map magnified for clarity.



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
09PODD00882J	74.64	3.54	74.92	5.38	75.3	7.67
09PODD00865J	73.73	3.7	74.06	5.68	74.58	8.05
09PODD00856J	73.03	3.71	73.22	5.7	73.41	7.93
09PODD00807	68.91	2.95	69.1	3.86	69.35	4.91
09PODD00766	63.89	3.57	64.12	5.27	64.17	5.67
09PODD00716W	58.63	3.5	58.85	5.98	58.93	6.99
09PODD00620J	53.89	3.81	54.22	5.94	54.48	8.11
09PODD00667	56.37	3.67	56.65	6.18	56.82	8.25

Figure 3-8: Extract from the CFRAMS fluvial map for the area (site indicated in red)

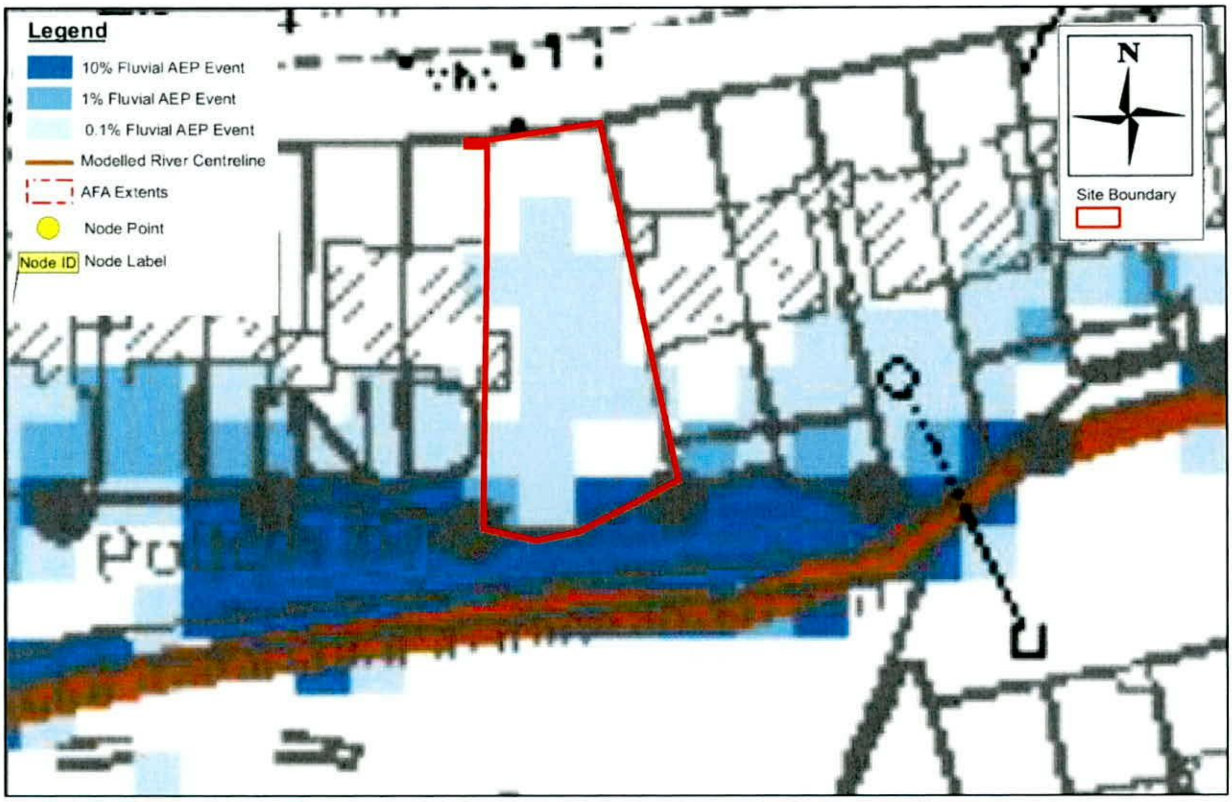


Figure 3-9: Extract from CFRAMS Fluvial Flood Extent Map (Magnified for Clarity)

The CFRAMS mapping indicates that there is a risk of fluvial flooding on the site. The site of the proposed dwelling lies partially within the 0.1%AEP flood extents and as such, the site is considered to be in Flood Zone B as per the OPW's *The Planning System and Flood Risk Management Guidelines* (2009). Examination of Figure 3-9 shows small portions of the southern end of the site fall within flood zone A. This is due to the coarse 5m DTM grid used in the preparation of the CFRAMS flood maps. From examination of the topographical survey data, the 1%AEP flood level would not encroach onto the site.

The closest CFRAMS nodes to the site predict flood levels in the River Poddle as per Table 3-1 below:

Table 3-1: CFRAMS Predicted Fluvial Flood Levels in the River Poddle Adjacent to the Site

Node	1% AEP	0.1% AEP
09PODD00667	56.65 mAOD	56.82 mAOD
09PODD00620J	54.22 mAOD	54.48 mAOD
Predicted flood level adjacent to site	55.72 mAOD	55.92 mAOD

By calculating the distance between our site and the 2 CFRAMS nodes, we can make an estimate of the flood level in the River Poddle directly adjacent to our site. To do this the distance from the site to the upstream and the downstream nodes was compared to the distance between the 2 nodes. The ratio was then applied to the flood levels from the CFRAMS flood map to estimate the flood levels adjacent to the site. The estimated 1%AEP and 0.1%AEP floods level at the site are **55.72mAOD and 55.92mOD** respectively.

Flood depth maps were also prepared as part of the CFRAMS programme and an extract from the relevant 0.1%AEP flood depth map is presented here as Figure 3-10. It can be seen from this map that predicted flood depths at the site for the 0.1%AEP event are in the region of 0 to 0.25m. Full CFRAMS fluvial extent and depth mapping for the area has been included in Appendix C of this report.

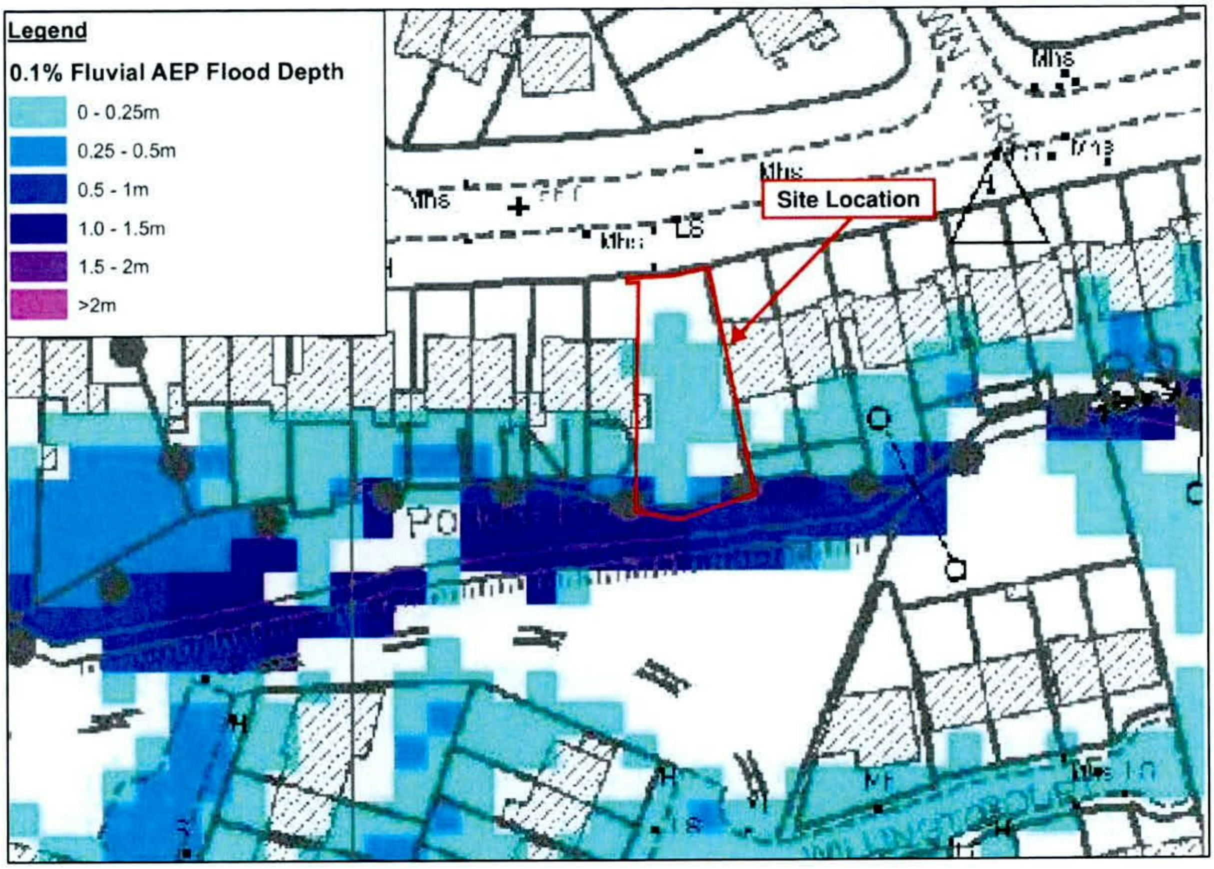


Figure 3-10: Extract from CFRAMS 0.1%AEP Fluial Depth Map

3.10 SDCC SFRA Flood Zone Mapping

A Draft Strategic Flood Risk Assessment (SFRA) was completed for SDCC in May 2021 to supplement the SDCC Draft Development Plan 2022-2028. Flood Zone Mapping was prepared as part of this assessment and an extract from the relevant map is presented here as Figure 3-11.

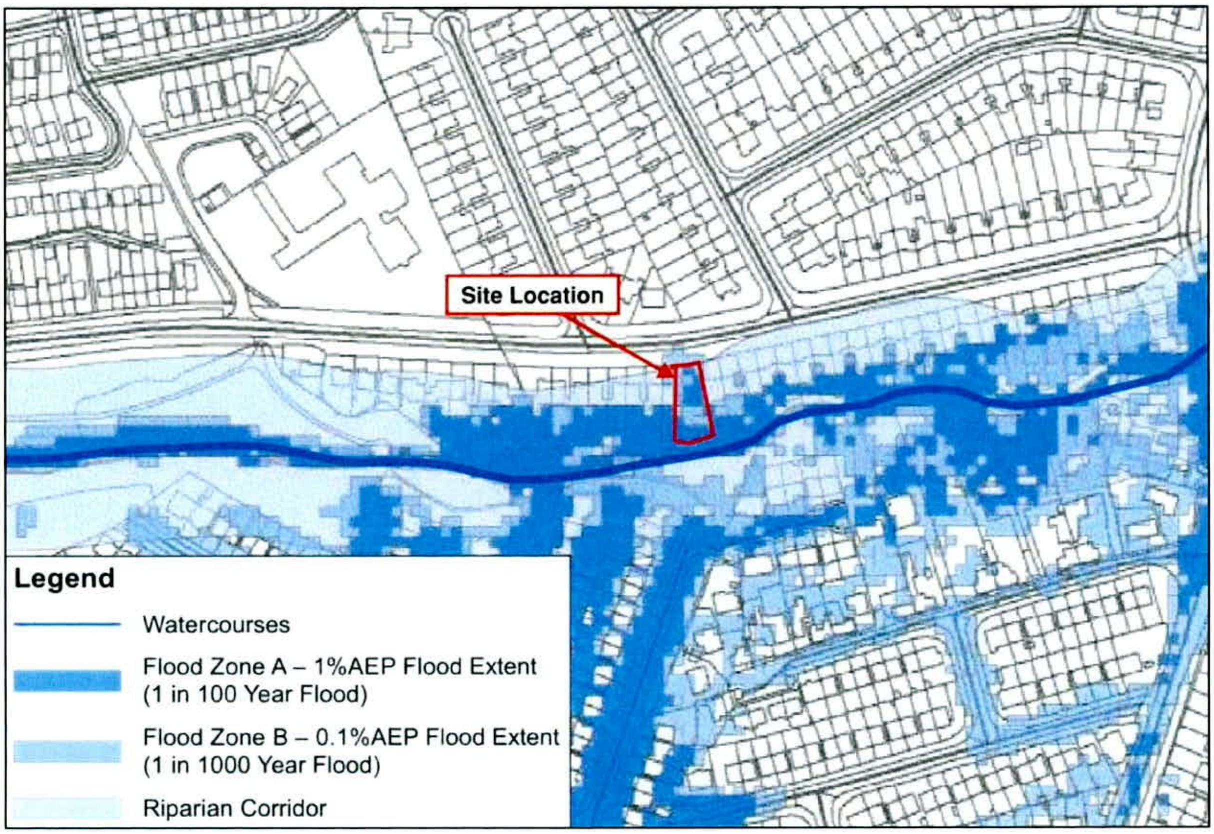


Figure 3-11: Extract from SDCC SFRA Flood Zone Mapping (Sheet 11 of 26)

The authors of the SFRA propose that

"...there is an increasing likelihood that Irelands climate will be similar to that depicted in the High End Future climate change scenario by the year 2100. Wherever zoning is discussed it should be assumed that this is to include a HEFS climate change allowance."

The flood extents on the zoning maps are therefore those predicted for a conservative future scenario. Climate change allowances are discussed further in Section 4.3. The site is located within Flood Zones A and B on this mapping when climate change is applied.

3.11 Estimate of Flood Zone

PUNCH Consulting Engineers have reviewed the available information as outlined in the above sections and conclude that the site is located in Flood Zone B for fluvial flooding. As per the OPW Planning System and Flood Risk Management Guideline, flood zones... *"are based on the current assessment of the 1% and the 0.1% fluvial events and the 0.5% and 0.1% tidal events, without the inclusion of climate change factors"*. For this reason, the flood zone has not been determined using the SDCC SFRA Flood Zone Mapping.

4 Flood Risk Assessment

4.1 Sources of Flooding

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

Fluvial Flooding

Fluvial flooding is the result of a river exceeding its capacity and excess water spilling out onto the adjacent floodplain. The proposed site is located adjacent to the River Poddle which experiences out of bank flooding during the 10%AEP, 1%AEP and the 0.1%AEP events. From a review of the available information, it was shown that approximately 55% of the site is located in Flood Zone B and is therefore considered at risk of fluvial flooding. The associated 0.1%AEP flood level at the site is approximately 55.92mAOD.

Coastal Flooding

Coastal flooding is the result of higher-than-normal sea levels causing sea water to overflow onto the land. It is usually caused by high tides or storm surges. The site of the proposed dwelling is located approximately 8 km from the coast and the River Poddle is not tidally influenced at this point. As such the site is not considered to be at risk of coastal flooding.

Pluvial Flooding

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. The proposed site will include a surface water drainage system to ensure pluvial flooding does not occur, see Downes Associates Planning Application Report for further details.

Groundwater Flooding

Groundwater flooding occurs when the level of the water stored in the ground rises as a result of prolonged rainfall. From a review of the available information and the fact that the proposed building does not have a basement, there is no risk of groundwater flooding at the site.

4.2 Site Vulnerability

The proposed development is residential in nature, which is classified as a "Highly Vulnerable Development". The Planning System and Flood Risk Management Guidelines gives definitions for the type of developments that can take place in each Flood Zone. Only Coastal and Fluvial flood zones are considered in determining whether a Justification Test is required.

Table 4-1: Matrix of Vulnerability versus Flood Zone to indicate Justification Requirement

	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

As the site is located in Flood Zone B and considered highly vulnerable, a Justification Test is required as per Table 4-1 above, Refer to Section 5 for further details.

4.3 Climate Change

Advice on the expected impacts of climate change and the allowances to provide for future flood risk management in Ireland is given in the "OPW Assessment of Potential Future Scenarios, Flood Risk Management Draft Guidance", 2009. Two climate change scenarios are considered. These are the Mid-range Future Scenario (MRFS) and the High-End Future Scenario (HEFS). The MRFS is intended to represent a "likely" future scenario based on the wide range of future predictions available. The HEFS represents a more "conservative" future scenario at the upper boundaries of future projections. Based on these two scenarios the OPW recommended allowances for climate change are given in Table 4-2. These allowances are also recommended in the SDCC Draft SFRA.

Table 4-2: Recommended allowances for climate change (Taken from OPW - Assessment of Potential Future Scenarios for Flood Risk Management)

Parameter	MRFS	HEFS
Extreme Rainfall Depths	+20%	+30%
Flood Flows	+20%	+30%
Mean Sea Level Rise	+500 mm	+1000 mm
Land Movement	-0.5 mm/year*	-0.5 mm/year*
Urbanisation	No general allowance - Review on Case by Case Basis	No General allowance - Review on Case by Case Basis
Forestation	-1/6Tp**	-1/3Tp** +10% SPR***

Notes:

* Applicable to the southern part of the country (Dublin - Galway and south of this)

** Reduce the time to peak (Tp) by a third; this allows for potential accelerated runoff that may arise as a result of drainage of afforested land

*** Add 10% to the Standard Percentage Runoff (SPR) rate; this allows for increased runoff rates that may arise flowing felling of forestry

As per Table 4-2 above, the flows in the River Poddle should be increased by 20% for the MRFS and 30% for and HEFS events to account for predicated future climate change effects.

The estimated river flows at the CFRAMS node upstream of the site (09PODD00667) have been taken from the CFRAMS fluvial flood extent map shown in Figure 3-8 of this report. These flows have been increased by 20% and 30% and the results are presented in **Table 4-3**.

Table 4-3: Predicted Existing and Future Scenario River Poddle Flows

Node	1% AEP	0.1% AEP
09PODD00667	6.18 m^3/s	8.25 m^3/s
09PODD00667 + 20% (MRFS)	7.42 m^3/s	9.9 m^3/s
09PODD00667 + 30% (HEFS)	8.03 m^3/s	10.73 m^3/s

It is noted from Table 4-3 that the 1%AEP HEFS flow is very similar in magnitude to the existing scenario 0.1%AEP flow. It is thus proposed that the 0.1%AEP fluvial flood extents and depths are representative of the 1%AEP HEFS event.

4.4 Flood Mitigation Measures

The following measures should be considered in the development design at a minimum:

1. The minimum Finished Floor Level (FFL) at this site should be set at 500mm above the 1%AEP HEFS flood level. The recommended FFL for the proposed development is therefore **56.42mAOD**.
2. A non-return value should be installed on the 300mm storm water pipe that crosses the site and discharges into the River Poddle as shown on Downes Associates Drawing No. 5001.
3. Emergency access for the proposed dwelling will be maintained via Limekiln Road during an extreme flood event.
4. The proposed development will provide stormwater drainage in accordance with the SDCC Draft Development Plan to alleviate pluvial flooding risk. See Downes Associates Planning Application Report and associated drawings for further details.

With the implementation of the above measures the site will be at low risk of flooding and will not increase the risk of flooding to any adjacent or nearby area.

5 Justification Test

Chapter 5, Box 5.1 of the OPW's *The Planning System Flood Risk Management Guidelines* (2009) states that all of the following criteria must be satisfied in order to meet the development management Justification Test. Table 5-1 below contains PUNCH Consulting Engineers response to each of the items in Box 5.1 and it is concluded that the proposed development complies with the requirements of the development management Justification Test.

Table 5-1 - Response to Development Management Justification Test for Proposed Development

	Item	Response
1.0	The subject lands have been zoned or otherwise designated for the particular use or form of development in an operative development plan, which has been adopted or varied taking account of these Guidelines.	The land is currently zoned as "RES - To Protect and/or improve residential amenity". The proposed development is residential in nature which is considered appropriate on the subject lands. The SDCC Development Plan is informed by an accompanying Strategic Flood Risk Assessment for the whole local authority catchment area including the development site.
2.0	The proposal has been subject to an appropriate flood risk assessment that demonstrates:	
2.1	The development proposed will not increase flood risk elsewhere and, if practicable, will reduce overall flood risk.	There are a number of potential aspects to consider when assessing if the proposed development will increase the flood risk elsewhere. i. Loss of flood Storage; ii. Diversion of flood waters; iii. Increased runoff from the proposed development. Given the nominal flood depths on the site, potential loss of flood storage is considered minimal. In keeping with the OPW's "The Planning System and Flood Risk Management" Guidelines Technical Appendix B, flood storage compensation is not proposed in Flood Zone B. As the proposed development is located at the edge of a flood zone it will not obstruct any existing overland flow paths. A flow path to and from the Poddle River will be maintained to the rear and side of the proposed property. All surface water flows generated within the proposed development will be captured by a dedicated surface water drainage network which will be designed for a 1 in 100-year storm event with allowance for climate change. The proposed surface water drainage system will mitigate against any pluvial flood risk at the development and will not increase flood risk elsewhere.

2.2	The development proposal includes measures to minimise flood risk to people, property, the economy and the environment as far as reasonably possible.	The principle measure taken to minimise the flood risk is to ensure that the proposed dwelling does not flood during a 1%AEP HEFS event. Finished floor levels within the proposed dwelling have been set at 56.42mOD, giving a freeboard of 500mm above the 1%AEP HEFS flood level.
2.3	The development proposed includes measures to ensure that residual risks to the area and/or development can be managed to an acceptable level as regards the adequacy of existing flood protection measures or the design, implementation and funding of any future flood risk management measures and provisions for emergency services access.	Refer to Section 4.4 of this report for details.
2.4	The development proposed addresses the above in a manner that is also compatible with the achievement of wider planning objectives in relation to development of good urban design and vibrant and active streetscapes.	It is PUNCH Consulting Engineers opinion that the proposed development complies with item 2.4. This is discussed in greater detail in other documents submitted as part of the planning application for the proposed dwelling.

6 Conclusions

PUNCH Consulting Engineers were appointed by John McWeeney to carry out a Site-Specific Flood Risk Assessment for a proposed for a proposed residential dwelling at No. 46A Limekiln Rd, Walkinstown, Dublin 12.

This Site-Specific Flood Risk Assessment has been carried out in accordance with *"The Planning System & Flood Risk Management Guidelines"* published by the Department of the Environment, Heritage and Local Government in November 2009 and the SDCC Local Area Plan.

A review of the flood risk in the area was carried out as the site is located near the River Poddle. It is noted that The River Poddle Flood Alleviation Scheme, currently at planning state, proposes to reduce the fluvial flood risk to the local area, including the subject site.

Flood Maps produced as part of the CFRAMS were consulted to establish the Flood Zone. It was determined that the proposed development site is currently located in Flood Zone B for fluvial flooding.

Box 5.1 of the Justification Test has been applied and it is concluded that the proposed development complies with the requirements.

As the proposed development is deemed "Highly Vulnerable" and partially located within Flood Zone B, the Justification Test was applied. It is concluded that the proposed development complies with the requirements of the Development Management Justification Test.

The proposed development site is at risk of flooding but is deemed appropriate provided the residual risk of fluvial flooding is addressed by implementing the measures discussed in Section 4.4. With the implementation of the flood mitigation measures, the site will be at low risk of flooding and will not increase the risk of flooding to any adjacent or nearby area.

Appendix A Site Visit Images

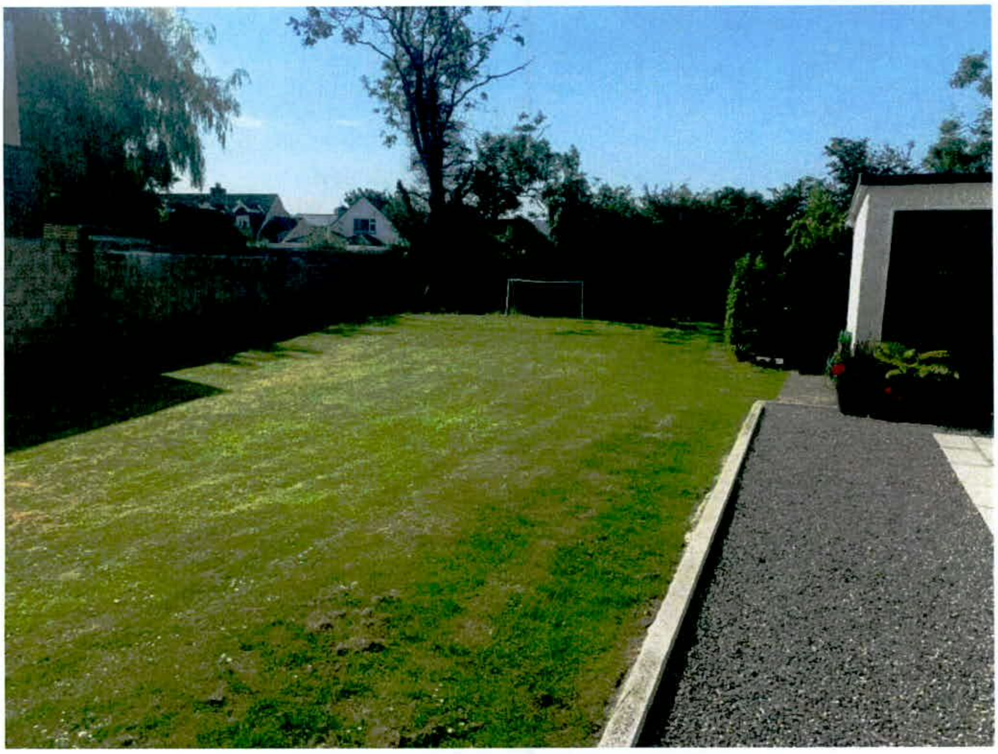


Image 1: Photo taken looking south, across the site

Image 2: Photo taken looking north, across the site

Image 3: Existing vehicular access to 46 Limekiln Road and proposed site

Image 4: Southern boundary of site

Image 5: River Poddle (covered in vegetation at time of visit)

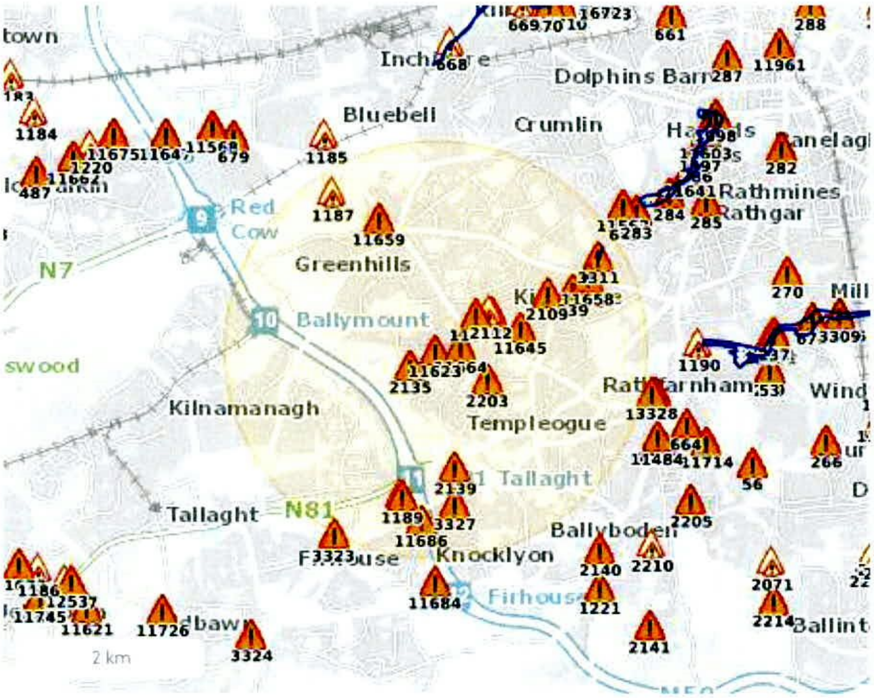
Appendix B OPW Historic Flood Events Record

Past Flood Event Local Area Summary Report

Report Produced: **12/7/2022 12:06**

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

This report has been downloaded from www.floodinfo.ie (the "**Website**"). The users should take account of the restrictions and limitations relating to the content and use of the Website that are explained in the Terms and Conditions. It is a condition of use of the Website that you agree to be bound by the disclaimer and other terms and conditions set out on the Website and to the privacy policy on the Website.



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

20 Results

	Name (Flood_ID)	Start Date	Event Location
1.	Poddle August 1986 (ID-32)	24/08/1986	Area
	Additional Information: Reports (9) Press Archive (1)		
2.	Poddle River Whitehall Gardens June 1993 (ID-2109)	10/06/1993	Exact Point
	Additional Information: Reports (1) Press Archive (1)		
3.	Poddle River Whitehall Road June 1993 (ID-2112)	10/06/1993	Approximate Point
	Additional Information: Reports (1) Press Archive (0)		
4.	Old City water Course Spawell House Feb 1994 (ID-2139)	03/02/1994	Exact Point
	Additional Information: Reports (1) Press Archive (0)		
5.	Poddle Glendown Crescent Feb 1994 (ID-2203)	03/02/1994	Exact Point
	Additional Information: Reports (1) Press Archive (0)		
6.	Poddle Park Nov 2000 (ID-3311)	05/11/2000	Approximate Point
	Additional Information: Reports (1) Press Archive (0)		

	Name (Flood_ID)	Start Date	Event Location
7.	Knocklyon Ave Nov 2000 (ID-3327) Additional Information: Reports (1) Press Archive (0)	05/11/2000	Approximate Point
8.	Osprey Estate Nov 1982 (ID-2135) Additional Information: Reports (1) Press Archive (0)	05/11/1982	Exact Point
9.	Poddle Fortfield Road Dec 1954 (ID-239) Additional Information: Reports (1) Press Archive (0)	08/12/1954	Approximate Point
10.	Robinhood Stream Walkinstown Recurring (ID-1187) Additional Information: Reports (3) Press Archive (0)	n/a	Approximate Point
11.	Whitehall Road Kimmage Recurring (ID-1188) Additional Information: Reports (2) Press Archive (0)	n/a	Approximate Point
12.	Dodder Mount Carmel Park recurring (ID-1189) Additional Information: Reports (2) Press Archive (1)	n/a	Approximate Point
13.	Mount Carmel Park Firhouse Nov 2000 (ID-3333) Additional Information: Reports (1) Press Archive (1)	05/11/2000	Approximate Point
14.	Flooding at Limekiln Road, Ballyboden Rd, Co. Dublin on 24th Oct 2011 (ID-11623) Additional Information: Reports (1) Press Archive (0)	23/10/2011	Approximate Point
15.	Flooding at Riverside Apartments, Milltown Road, Dublin 6 on 24th Oct 2011 (ID-11645) Additional Information: Reports (1) Press Archive (0)	23/10/2011	Exact Point
16.	Flooding at Junction of Terenure Road and Kimmage Road, Dublin 6W on 24th Oct 2011 (ID-11658) Additional Information: Reports (1) Press Archive (0)	23/10/2011	Exact Point
17.	Flooding at Walkinstown Crescent, Walkinstown, Dublin 12 on 24th Oct 2011 (ID-11659) Additional Information: Reports (1) Press Archive (0)	23/10/2011	Exact Point
18.	Flooding at Wellington Lane, Dublin 24 on 24th Oct 2011 (ID-11664) Additional Information: Reports (1) Press Archive (0)	23/10/2011	Exact Point
19.	Flooding at Whitehall Road, Templeogue, Dublin 6W on 24th Oct 2011 (ID-11666) Additional Information: Reports (1) Press Archive (0)	23/10/2011	Exact Point
20.	Flooding at Homeville, Knocklyon, Dublin 16.on 24th Oct 2011 (ID-11686) Additional Information: Reports (1) Press Archive (0)	23/10/2011	Exact Point

Flooding at Limekiln Road 24th October 2011

The information contained in this report has been extracted from a Flood Data Collection Form submitted to The Office Of Public Works (OPW) by Consultants working on the Eastern River Basin District (RBD) Catchment Flood Risk Assessment and Management (CFRAM) Project.

1 Location and date of flood event:

Location: Limekiln Road, Ballyboden, Co. Dublin
Irish Grid Co-ordinates – 311,591 229,495

This flooding event started on 24th October 2011. The peak flood also occurred on 24th October 2011.

2 Source and cause:

The source of the flood waters was the River Poddle, which was overtopped. Flood water came up through the drains from the River Poddle in to the front of the affected properties. The rears of the properties were protected by walls, which were not overtopped.

3 Flood data:

The following flood information was provided:

Flood Parameter	Max Value	Typical Value	Comments
Flood Level (metres OD Malin)			
Flood Depth (metres)		0.3	
Flood Flow (m^3/s)			
Flood Velocity (m/s)			

It is not known if there was previous flooding at this location.

4 Impacts of flooding event:

Impacts to people: There was no loss of life or serious injury as a result of this flooding event.

Impacts to property:
Residential – 8 residential properties were flooded during this event. Water came up from private drains.

Impacts to transport infrastructure: Road – There were no roads affected by this flooding event.

5 **Documents Attached:**

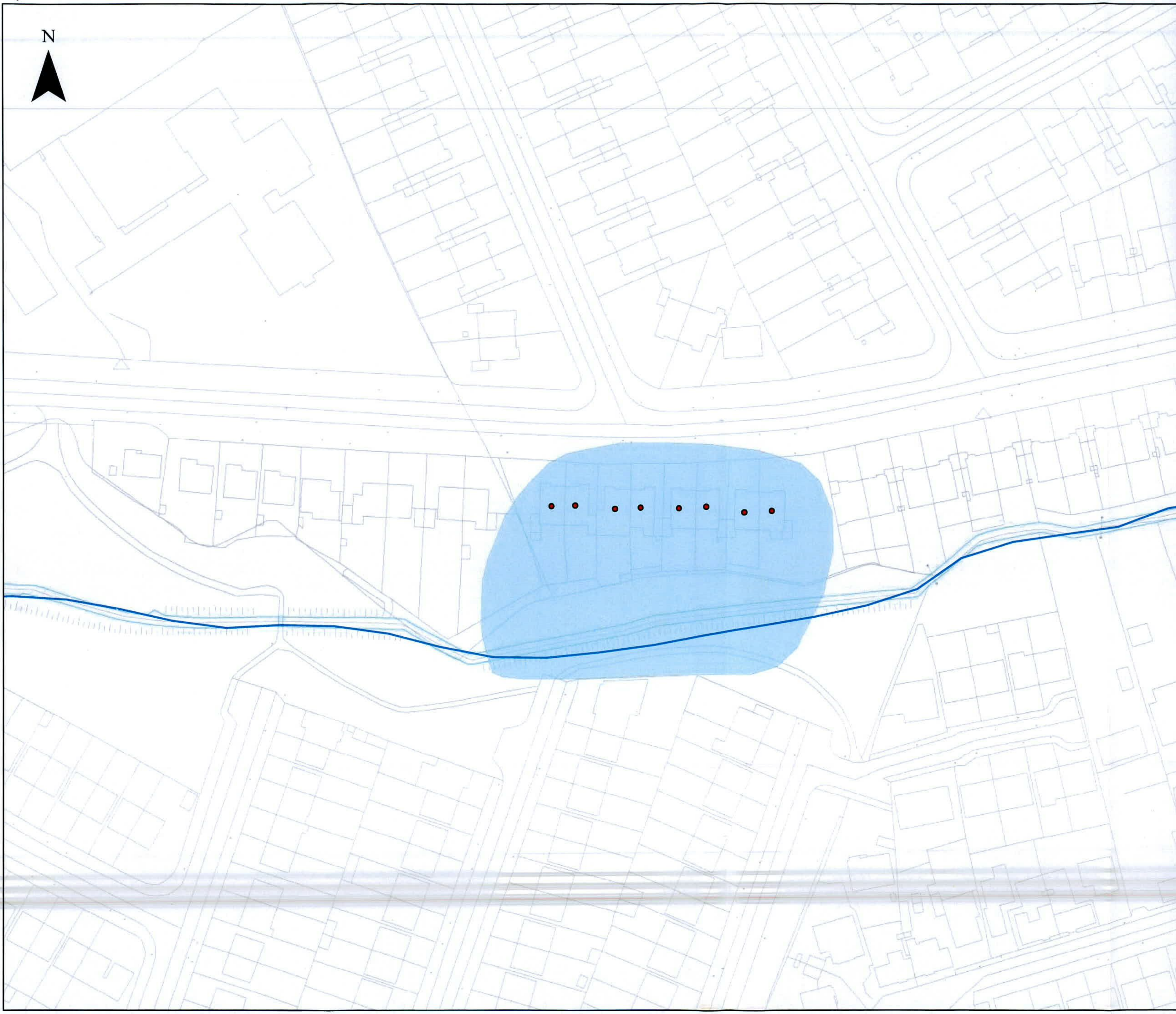
Photographs and a map of the affected area is attached.

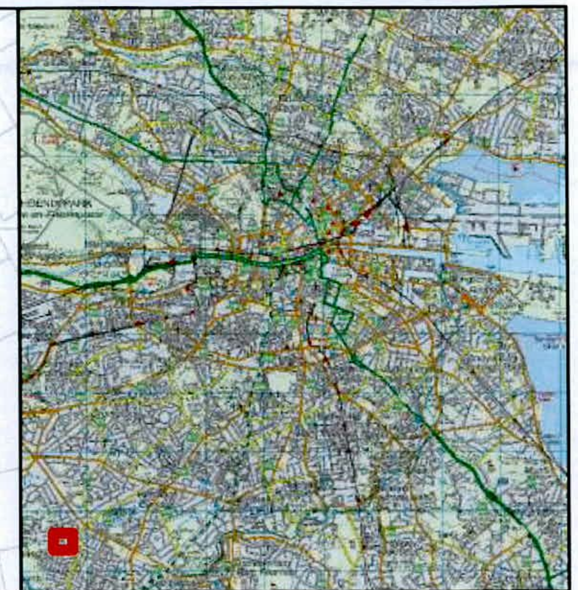
Limekiln Rd, Ballyboden

01.jpg

02.jpg

Appendix C CFRAMS Mapping





Legend

Flooding Recorded By

- LOCAL COUNCIL
- RPS
- UNCONFIRMED
- River Centreline
- Flood Extent

0 20 40 Meters

CLIENT

OPW
The Office of Public Works
Oifig na nOibreacha Poiblí

PROJECT

EASTERN CFRAMS

TITLE

FLOOD EXTENT
LIMEKILN ROAD

RPS Consulting Engineers

ELMWOOD HOUSE
74 BOUCHER ROAD
BELFAST BT12 6RZ

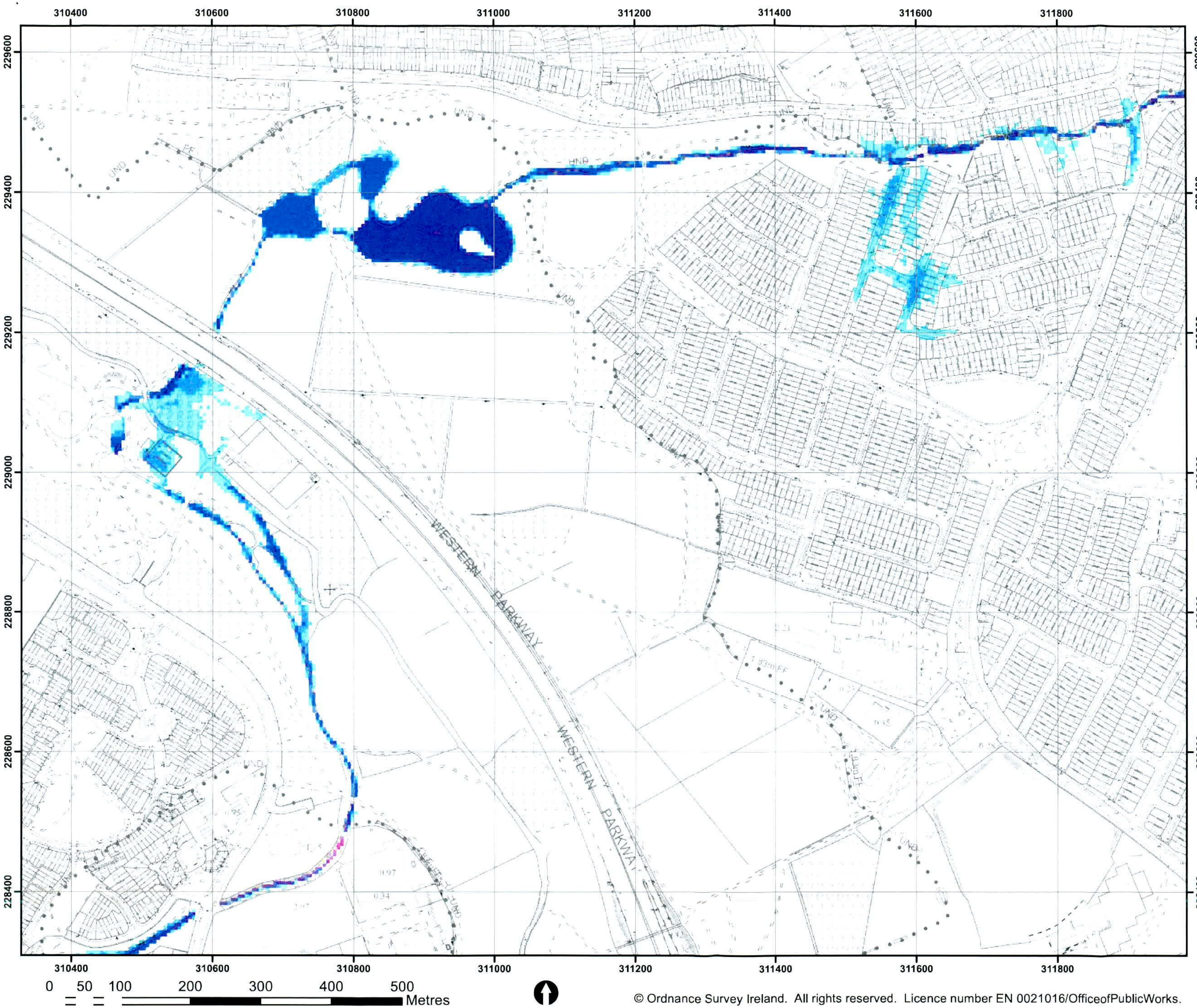
TEL : 028 9066 7914
FAX : 028 9066 8286
www.rpsgroup.com/Ireland

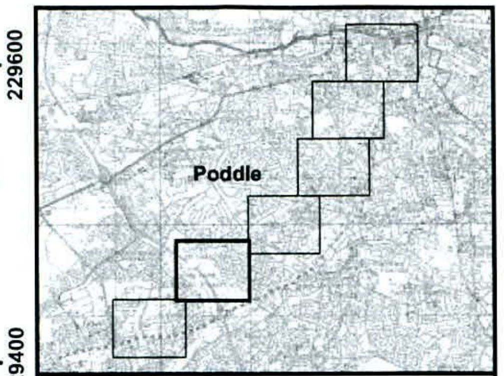
Drawing No. :

IBE0600_FER_009

Drawn By : BA
Checked By : AJ
Approved By : MB
Date : 12/01/2012

SCALE : 1:1,000





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:

CFRAM

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:
Poddle River Fluvial Flood Depths

Map Type:	**DEPTH**
Source:	**FLUVIAL**
Map Area:	**HPW**
Scenario:	**CURRENT**
Drawn By : F.M.C.	**Date : 20 October 2016**
Checked By : A.S.	**Date : 20 October 2016**
Approved By : S.P.	**Date : 20 October 2016**

Drawing No. :
E09POD_DPFCD010_F0_02

Map Series : Page 2 of 6

Drawing Scale : 1:5,000 @ A3

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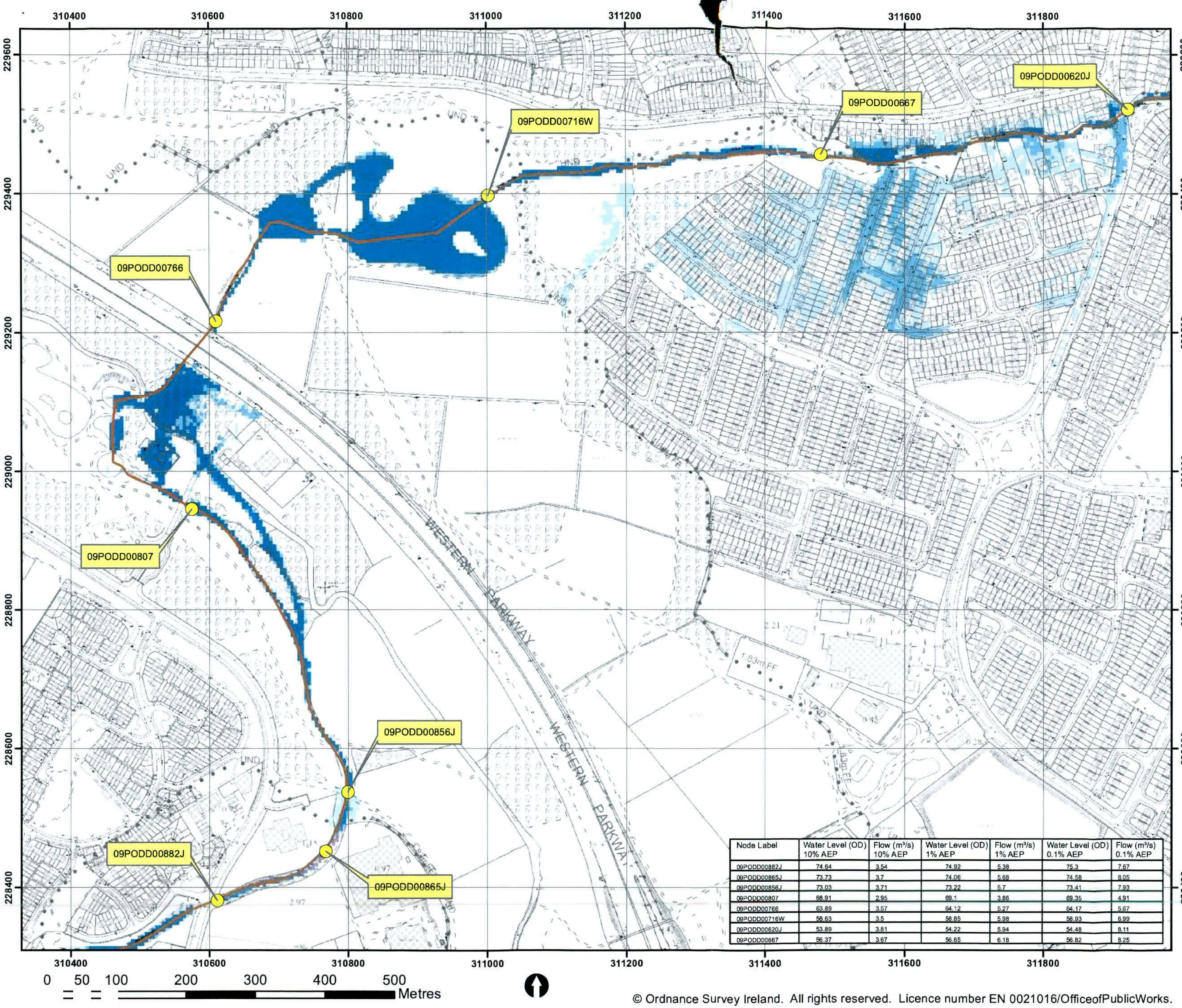

Node Label	Water Level (OD) 10% AEP	Flow (m^3/s) 10% AEP	Water Level (OD) 1% AEP	Flow (m^3/s) 1% AEP	Water Level (OD) 0.1% AEP	Flow (m^3/s) 0.1% AEP
09PODD00882J	74.64	3.54	74.92	5.38	75.3	7.67
09PODD00865J	73.73	3.7	74.06	5.68	74.58	8.05
09PODD00856J	73.03	3.71	73.22	5.7	73.41	7.93
09PODD00807	68.91	2.95	69.1	3.86	69.35	4.91
09PODD00766	63.89	3.57	64.12	5.27	64.17	5.67
09PODD00716W	58.63	3.5	58.85	5.98	58.93	6.99
09PODD00620J	53.89	3.81	54.22	5.94	54.48	8.11
09PODD00667	56.37	3.67	56.65	6.18	56.82	8.25

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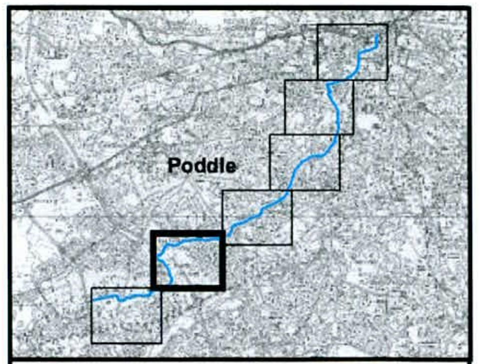

IMPORTANT USER NOTE:
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Legend

- 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:

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

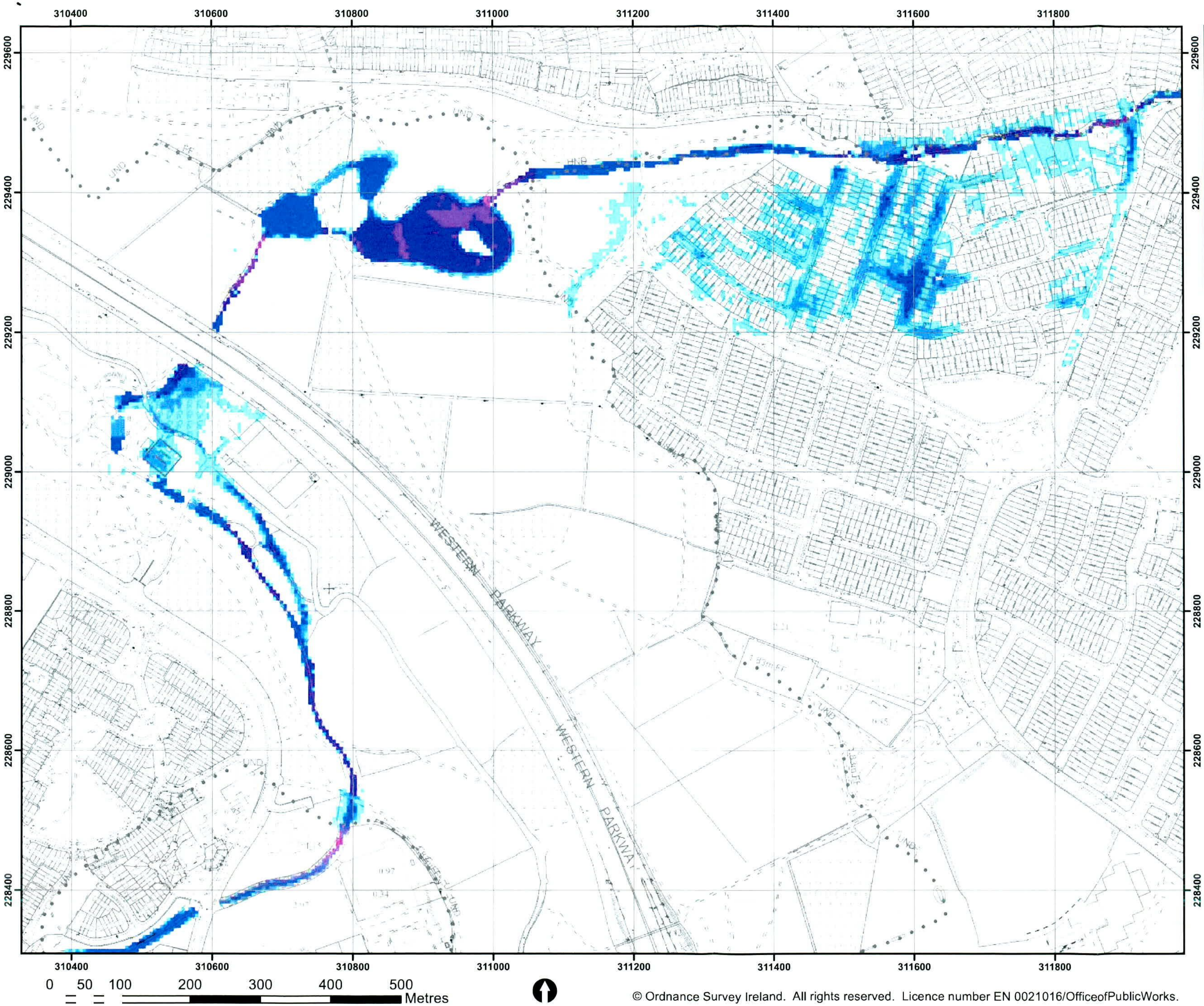
Map:
Poddle River Fluvial Flood Extents

Map Type:	EXTENT
Source:	FLUVIAL
Map Area:	HPW
Scenario:	CURRENT
Drawn By: F.M.C.	Date: 11 August 2016
Checked By: A.S.	Date: 11 August 2016
Approved By: S.P.	Date: 11 August 2016

Drawing No.:
E09POD_EXFCD_F0_02

Map Series: Page 2 of 6

Drawing Scale: 1:5,000 @A3



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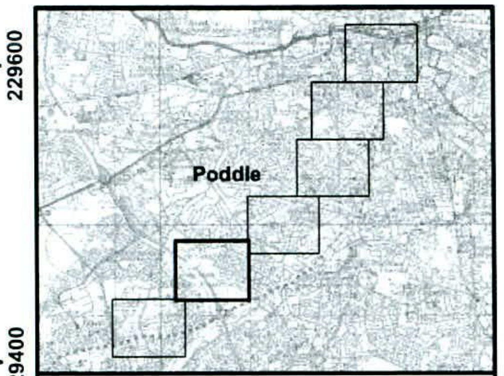

IMPORTANT USER NOTE:
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Legend

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

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:

Poddle River Fluvial Flood Depths

Map Type:	**DEPTH**
Source:	**FLUVIAL**
Map Area:	**HPW**
Scenario:	**CURRENT**
Drawn By : F.M.C.	**Date : 20 October 2016**
Checked By : A.S.	**Date : 20 October 2016**
Approved By : S.P.	**Date : 20 October 2016**

Drawing No. :

E09POD_DPFCD001_F0_02

Map Series : Page 2 of 6

Drawing Scale : 1:5,000 @ A3

APPENDIX B

STORMWATER MODELLING CALCULATION OUTPUT

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	1	Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	0	Minimum Velocity (m/s)	0.80
FSR Region	Scotland and Ireland	Connection Type	Level Soffits
M5-60 (mm)	17.300	Minimum Backdrop Height (m)	0.000
Ratio-R	0.360	Preferred Cover Depth (m)	0.000
CV	0.750	Include Intermediate Ground	✓
Time of Entry (mins)	5.00	Enforce best practice design rules	✓

Node S5 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Downstream Link	2.005	Sump Available	✓
Replaces Downstream Link	x	Product Number	CTL-SHE-0014-1000-0800-1000
Invert Level (m)	54.961	Min Outlet Diameter (m)	0.075
Design Depth (m)	0.800	Min Node Diameter (mm)	1200
Design Flow (l/s)	0.1		

Node S4 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	54.977
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	

Depth (m)	Area (m^2)	Inf Area (m^2)	Depth (m)	Area (m^2)	Inf Area (m^2)	Depth (m)	Area (m^2)	Inf Area (m^2)
0.000	4.0	0.0	0.600	4.0	0.0	0.601	0.0	0.0

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Results for 100 year +20% CC Critical Storm Duration. Lowest mass balance: 98.36%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m^3)	Flood (m^3)	Status
15 minute summer	S13	1	55.170	0.000	0.0	0.0000	0.0000	OK
15 minute summer	S12	1	55.099	0.000	0.0	0.0000	0.0000	OK
15 minute summer	S8	10	55.803	0.043	2.2	0.0151	0.0000	OK
360 minute summer	S9	296	55.792	0.099	0.4	0.0089	0.0000	OK
360 minute summer	S10	288	55.792	0.127	0.7	0.1503	0.0000	OK
15 minute summer	S1	10	55.803	0.043	2.2	0.0084	0.0000	OK
360 minute summer	S2	296	55.792	0.131	0.4	0.1485	0.0000	OK
360 minute summer	S3	296	55.793	0.157	1.1	0.1774	0.0000	SURCHARGED
360 minute summer	S4	288	55.792	0.815	1.1	2.4020	0.0000	SURCHARGED
240 minute summer	S5	240	55.792	0.831	0.5	0.9398	0.0000	SURCHARGED
360 minute summer	S11	296	54.789	0.008	0.1	0.0089	0.0000	OK
360 minute summer	S14	296	54.701	0.004	0.1	0.0000	0.0000	OK

Link Event (Outflow)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m^3)	Discharge Vol (m^3)
15 minute summer	S13	1.000	S12	0.0	0.000	0.000	0.0000	
15 minute summer	S12	1.001	S11	0.0	0.000	0.000	0.0064	
15 minute summer	S8	2.000	S9	2.2	0.516	0.174	0.0573	
15 minute summer	S9	2.001	S10	2.2	0.402	0.171	0.0297	
15 minute summer	S10	2.002	S3	3.4	0.463	0.268	0.0423	
15 minute summer	S1	3.000	S2	2.2	0.517	0.176	0.0921	
15 minute summer	S2	3.001	S3	2.1	0.312	0.167	0.0311	
15 minute summer	S3	2.003	S4	5.4	0.676	0.431	0.0127	
15 minute summer	S4	2.004	S5	1.7	0.471	0.138	0.0574	
360 minute summer	S5	2.005	S11	0.1	0.230	0.008	0.0027	
360 minute summer	S11	1.002	S14	0.1	0.322	0.001	0.0028	2.7

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Results for 100 year +20% CC 15 minute summer. 255 minute analysis at 1 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S13	1	55.170	0.000	0.0	0.0000	0.0000	OK
15 minute summer	S12	1	55.099	0.000	0.0	0.0000	0.0000	OK
15 minute summer	S8	10	55.803	0.043	2.2	0.0151	0.0000	OK
15 minute summer	S9	11	55.738	0.045	2.2	0.0040	0.0000	OK
15 minute summer	S10	11	55.724	0.059	3.4	0.0692	0.0000	OK
15 minute summer	S1	10	55.803	0.043	2.2	0.0084	0.0000	OK
15 minute summer	S2	11	55.712	0.051	2.2	0.0575	0.0000	OK
15 minute summer	S3	11	55.708	0.072	5.4	0.0814	0.0000	OK
15 minute summer	S4	26	55.405	0.428	5.4	1.7122	0.0000	SURCHARGED
15 minute summer	S5	26	55.405	0.444	1.7	0.5022	0.0000	SURCHARGED
15 minute summer	S11	29	54.788	0.007	0.1	0.0080	0.0000	OK
15 minute summer	S14	29	54.700	0.003	0.1	0.0000	0.0000	OK

Link Event	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S13	1.000	S12	0.0	0.000	0.000	0.0000	
15 minute summer	S12	1.001	S11	0.0	0.000	0.000	0.0064	
15 minute summer	S8	2.000	S9	2.2	0.516	0.174	0.0573	
15 minute summer	S9	2.001	S10	2.2	0.402	0.171	0.0297	
15 minute summer	S10	2.002	S3	3.4	0.463	0.268	0.0423	
15 minute summer	S1	3.000	S2	2.2	0.517	0.176	0.0921	
15 minute summer	S2	3.001	S3	2.1	0.312	0.167	0.0311	
15 minute summer	S3	2.003	S4	5.4	0.676	0.431	0.0127	
15 minute summer	S4	2.004	S5	1.7	0.471	0.138	0.0574	
15 minute summer	S5	2.005	S11	0.1	0.211	0.006	0.0023	
15 minute summer	S11	1.002	S14	0.1	0.311	0.001	0.0023	1.0

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Results for 100 year +20% CC 30 minute summer. 270 minute analysis at 1 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m^3)	Flood (m^3)	Status
30 minute summer	S13	1	55.170	0.000	0.0	0.0000	0.0000	OK
30 minute summer	S12	1	55.099	0.000	0.0	0.0000	0.0000	OK
30 minute summer	S8	18	55.800	0.040	1.9	0.0141	0.0000	OK
30 minute summer	S9	18	55.734	0.041	1.9	0.0037	0.0000	OK
30 minute summer	S10	18	55.720	0.055	3.1	0.0649	0.0000	OK
30 minute summer	S1	17	55.800	0.040	1.9	0.0078	0.0000	OK
30 minute summer	S2	19	55.708	0.047	1.9	0.0529	0.0000	OK
30 minute summer	S3	19	55.704	0.068	4.9	0.0770	0.0000	OK
30 minute summer	S4	39	55.553	0.576	4.9	2.3024	0.0000	SURCHARGED
30 minute summer	S5	39	55.553	0.592	1.4	0.6691	0.0000	SURCHARGED
30 minute summer	S11	42	54.788	0.007	0.1	0.0084	0.0000	OK
30 minute summer	S14	42	54.701	0.004	0.1	0.0000	0.0000	OK

Link Event	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m^3)	Discharge Vol (m^3)
30 minute summer	S13	1.000	S12	0.0	0.000	0.000	0.0000	
30 minute summer	S12	1.001	S11	0.0	0.000	0.000	0.0068	
30 minute summer	S8	2.000	S9	1.9	0.498	0.153	0.0519	
30 minute summer	S9	2.001	S10	1.9	0.389	0.150	0.0269	
30 minute summer	S10	2.002	S3	3.0	0.452	0.242	0.0389	
30 minute summer	S1	3.000	S2	1.9	0.493	0.153	0.0823	
30 minute summer	S2	3.001	S3	1.9	0.306	0.150	0.0284	
30 minute summer	S3	2.003	S4	4.9	0.657	0.390	0.0118	
30 minute summer	S4	2.004	S5	1.4	0.384	0.116	0.0574	
30 minute summer	S5	2.005	S11	0.1	0.220	0.007	0.0025	
30 minute summer	S11	1.002	S14	0.1	0.316	0.001	0.0025	1.2

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Results for 100 year +20% CC 60 minute summer. 300 minute analysis at 1 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute summer	S13	1	55.170	0.000	0.0	0.0000	0.0000	OK
60 minute summer	S12	1	55.099	0.000	0.0	0.0000	0.0000	OK
60 minute summer	S8	32	55.795	0.035	1.4	0.0121	0.0000	OK
60 minute summer	S9	34	55.727	0.034	1.4	0.0031	0.0000	OK
60 minute summer	S10	33	55.711	0.046	2.3	0.0543	0.0000	OK
60 minute summer	S1	32	55.794	0.034	1.4	0.0068	0.0000	OK
60 minute summer	S2	64	55.703	0.042	1.4	0.0477	0.0000	OK
60 minute summer	S3	65	55.703	0.067	3.7	0.0760	0.0000	OK
60 minute summer	S4	65	55.703	0.726	3.6	2.4020	0.0000	SURCHARGED
60 minute summer	S5	65	55.703	0.742	0.9	0.8394	0.0000	SURCHARGED
60 minute summer	S11	68	54.789	0.008	0.1	0.0087	0.0000	OK
60 minute summer	S14	68	54.701	0.004	0.1	0.0000	0.0000	OK

Link Event	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
60 minute summer	S13	1.000	S12	0.0	0.000	0.000	0.0000	
60 minute summer	S12	1.001	S11	0.0	0.000	0.000	0.0073	
60 minute summer	S8	2.000	S9	1.4	0.463	0.112	0.0410	
60 minute summer	S9	2.001	S10	1.4	0.375	0.111	0.0210	
60 minute summer	S10	2.002	S3	2.3	0.423	0.182	0.0321	
60 minute summer	S1	3.000	S2	1.4	0.460	0.113	0.0635	
60 minute summer	S2	3.001	S3	1.4	0.300	0.113	0.0266	
60 minute summer	S3	2.003	S4	3.6	0.603	0.291	0.0131	
60 minute summer	S4	2.004	S5	0.9	0.342	0.072	0.0574	
60 minute summer	S5	2.005	S11	0.1	0.227	0.008	0.0026	
60 minute summer	S11	1.002	S14	0.1	0.321	0.001	0.0027	1.5

Results for 100 year +20% CC 120 minute summer. 360 minute analysis at 2 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
120 minute summer	S13	2	55.170	0.000	0.0	0.0000	0.0000	OK
120 minute summer	S12	2	55.099	0.000	0.0	0.0000	0.0000	OK
120 minute summer	S8	64	55.788	0.028	0.9	0.0097	0.0000	OK
120 minute summer	S9	124	55.759	0.066	0.9	0.0059	0.0000	OK
120 minute summer	S10	126	55.758	0.093	1.5	0.1099	0.0000	OK
120 minute summer	S1	64	55.788	0.028	0.9	0.0055	0.0000	OK
120 minute summer	S2	124	55.759	0.098	0.9	0.1106	0.0000	OK
120 minute summer	S3	124	55.758	0.122	2.4	0.1383	0.0000	OK
120 minute summer	S4	126	55.758	0.781	2.4	2.4020	0.0000	SURCHARGED
120 minute summer	S5	126	55.758	0.797	0.8	0.9019	0.0000	SURCHARGED
120 minute summer	S11	130	54.789	0.008	0.1	0.0088	0.0000	OK
120 minute summer	S14	130	54.701	0.004	0.1	0.0000	0.0000	OK

Link Event	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
120 minute summer	S13	1.000	S12	0.0	0.000	0.000	0.0000	
120 minute summer	S12	1.001	S11	0.0	0.000	0.000	0.0074	
120 minute summer	S8	2.000	S9	0.9	0.410	0.072	0.0519	
120 minute summer	S9	2.001	S10	0.9	0.337	0.071	0.0521	
120 minute summer	S10	2.002	S3	1.5	0.384	0.119	0.0771	
120 minute summer	S1	3.000	S2	0.9	0.410	0.072	0.1242	
120 minute summer	S2	3.001	S3	0.9	0.279	0.072	0.0638	
120 minute summer	S3	2.003	S4	2.4	0.536	0.190	0.0251	
120 minute summer	S4	2.004	S5	0.8	0.315	0.068	0.0574	
120 minute summer	S5	2.005	S11	0.1	0.229	0.008	0.0027	
120 minute summer	S11	1.002	S14	0.1	0.322	0.001	0.0028	1.8

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Results for 100 year +20% CC 180 minute summer. 420 minute analysis at 4 minute timestep. Mass balance: 99.05%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
180 minute summer	S13	4	55.170	0.000	0.0	0.0000	0.0000	OK
180 minute summer	S12	4	55.099	0.000	0.0	0.0000	0.0000	OK
180 minute summer	S8	96	55.784	0.024	0.7	0.0085	0.0000	OK
180 minute summer	S9	180	55.780	0.087	0.7	0.0079	0.0000	OK
180 minute summer	S10	184	55.780	0.115	1.1	0.1362	0.0000	OK
180 minute summer	S1	96	55.784	0.024	0.7	0.0048	0.0000	OK
180 minute summer	S2	180	55.780	0.119	0.7	0.1351	0.0000	OK
180 minute summer	S3	184	55.780	0.144	1.8	0.1633	0.0000	OK
180 minute summer	S4	176	55.780	0.803	1.8	2.4020	0.0000	SURCHARGED
180 minute summer	S5	184	55.780	0.819	0.5	0.9258	0.0000	SURCHARGED
180 minute summer	S11	184	54.789	0.008	0.1	0.0088	0.0000	OK
180 minute summer	S14	184	54.701	0.004	0.1	0.0000	0.0000	OK

Link Event	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
180 minute summer	S13	1.000	S12	0.0	0.000	0.000	0.0000	
180 minute summer	S12	1.001	S11	0.0	0.000	0.000	0.0074	
180 minute summer	S8	2.000	S9	0.7	0.381	0.056	0.0814	
180 minute summer	S9	2.001	S10	0.7	0.327	0.056	0.0694	
180 minute summer	S10	2.002	S3	1.1	0.354	0.088	0.0917	
180 minute summer	S1	3.000	S2	0.7	0.381	0.056	0.1633	
180 minute summer	S2	3.001	S3	0.7	0.266	0.057	0.0755	
180 minute summer	S3	2.003	S4	1.8	0.496	0.144	0.0279	
180 minute summer	S4	2.004	S5	0.5	0.268	0.038	0.0574	
180 minute summer	S5	2.005	S11	0.1	0.230	0.008	0.0027	
180 minute summer	S11	1.002	S14	0.1	0.322	0.001	0.0028	2.1

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Results for 100 year +20% CC 240 minute summer. 480 minute analysis at 4 minute timestep. Mass balance: 98.36%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
240 minute summer	S13	4	55.170	0.000	0.0	0.0000	0.0000	OK
240 minute summer	S12	4	55.099	0.000	0.0	0.0000	0.0000	OK
240 minute summer	S8	240	55.792	0.032	0.6	0.0112	0.0000	OK
240 minute summer	S9	240	55.792	0.099	0.6	0.0089	0.0000	OK
240 minute summer	S10	244	55.792	0.127	0.9	0.1495	0.0000	OK
240 minute summer	S1	240	55.792	0.032	0.6	0.0063	0.0000	OK
240 minute summer	S2	244	55.792	0.131	0.6	0.1483	0.0000	OK
240 minute summer	S3	240	55.792	0.156	1.4	0.1765	0.0000	SURCHARGED
240 minute summer	S4	248	55.791	0.814	1.4	2.4020	0.0000	SURCHARGED
240 minute summer	S5	240	55.792	0.831	0.5	0.9398	0.0000	SURCHARGED
240 minute summer	S11	244	54.789	0.008	0.1	0.0089	0.0000	OK
240 minute summer	S14	244	54.701	0.004	0.1	0.0000	0.0000	OK

Link Event	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
240 minute summer	S13	1.000	S12	0.0	0.000	0.000	0.0000	
240 minute summer	S12	1.001	S11	0.0	0.000	0.000	0.0075	
240 minute summer	S8	2.000	S9	0.6	0.365	0.047	0.1015	
240 minute summer	S9	2.001	S10	0.6	0.313	0.045	0.0777	
240 minute summer	S10	2.002	S3	0.9	0.330	0.068	0.0960	
240 minute summer	S1	3.000	S2	0.6	0.364	0.047	0.1893	
240 minute summer	S2	3.001	S3	0.6	0.256	0.046	0.0793	
240 minute summer	S3	2.003	S4	1.4	0.463	0.112	0.0280	
240 minute summer	S4	2.004	S5	0.5	0.268	0.038	0.0574	
240 minute summer	S5	2.005	S11	0.1	0.230	0.008	0.0027	
240 minute summer	S11	1.002	S14	0.1	0.322	0.001	0.0028	2.4

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Results for 100 year +20% CC 360 minute summer. 600 minute analysis at 8 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
360 minute summer	S13	8	55.170	0.000	0.0	0.0000	0.0000	OK
360 minute summer	S12	8	55.099	0.000	0.0	0.0000	0.0000	OK
360 minute summer	S8	288	55.792	0.032	0.4	0.0112	0.0000	OK
360 minute summer	S9	296	55.792	0.099	0.4	0.0089	0.0000	OK
360 minute summer	S10	288	55.792	0.127	0.7	0.1503	0.0000	OK
360 minute summer	S1	288	55.792	0.032	0.4	0.0063	0.0000	OK
360 minute summer	S2	296	55.792	0.131	0.4	0.1485	0.0000	OK
360 minute summer	S3	296	55.793	0.157	1.1	0.1774	0.0000	SURCHARGED
360 minute summer	S4	288	55.792	0.815	1.1	2.4020	0.0000	SURCHARGED
360 minute summer	S5	288	55.792	0.831	0.4	0.9397	0.0000	SURCHARGED
360 minute summer	S11	296	54.789	0.008	0.1	0.0089	0.0000	OK
360 minute summer	S14	296	54.701	0.004	0.1	0.0000	0.0000	OK

Link Event	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
360 minute summer	S13	1.000	S12	0.0	0.000	0.000	0.0000	
360 minute summer	S12	1.001	S11	0.0	0.000	0.000	0.0075	
360 minute summer	S8	2.000	S9	0.4	0.323	0.032	0.1018	
360 minute summer	S9	2.001	S10	0.4	0.281	0.032	0.0781	
360 minute summer	S10	2.002	S3	0.7	0.317	0.055	0.0963	
360 minute summer	S1	3.000	S2	0.4	0.323	0.032	0.1897	
360 minute summer	S2	3.001	S3	0.4	0.234	0.032	0.0794	
360 minute summer	S3	2.003	S4	1.1	0.434	0.087	0.0280	
360 minute summer	S4	2.004	S5	0.4	0.254	0.032	0.0574	
360 minute summer	S5	2.005	S11	0.1	0.230	0.008	0.0027	
360 minute summer	S11	1.002	S14	0.1	0.322	0.001	0.0028	2.7

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Results for 100 year +20% CC 480 minute summer. 720 minute analysis at 8 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m^3)	Flood (m^3)	Status
480 minute summer	S13	8	55.170	0.000	0.0	0.0000	0.0000	OK
480 minute summer	S12	8	55.099	0.000	0.0	0.0000	0.0000	OK
480 minute summer	S8	240	55.776	0.016	0.3	0.0057	0.0000	OK
480 minute summer	S9	352	55.774	0.081	0.3	0.0073	0.0000	OK
480 minute summer	S10	352	55.774	0.109	0.5	0.1288	0.0000	OK
480 minute summer	S1	240	55.776	0.016	0.3	0.0032	0.0000	OK
480 minute summer	S2	352	55.774	0.113	0.3	0.1278	0.0000	OK
480 minute summer	S3	352	55.775	0.139	0.8	0.1568	0.0000	OK
480 minute summer	S4	360	55.773	0.796	0.8	2.4020	0.0000	SURCHARGED
480 minute summer	S5	360	55.774	0.813	0.2	0.9196	0.0000	SURCHARGED
480 minute summer	S11	360	54.789	0.008	0.1	0.0088	0.0000	OK
480 minute summer	S14	360	54.701	0.004	0.1	0.0000	0.0000	OK

Link Event	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m^3)	Discharge Vol (m^3)
480 minute summer	S13	1.000	S12	0.0	0.000	0.000	0.0000	
480 minute summer	S12	1.001	S11	0.0	0.000	0.000	0.0074	
480 minute summer	S8	2.000	S9	0.3	0.297	0.024	0.0709	
480 minute summer	S9	2.001	S10	0.3	0.265	0.024	0.0647	
480 minute summer	S10	2.002	S3	0.5	0.286	0.040	0.0881	
480 minute summer	S1	3.000	S2	0.3	0.296	0.024	0.1499	
480 minute summer	S2	3.001	S3	0.3	0.212	0.024	0.0725	
480 minute summer	S3	2.003	S4	0.8	0.399	0.064	0.0274	
480 minute summer	S4	2.004	S5	0.2	0.254	0.020	0.0574	
480 minute summer	S5	2.005	S11	0.1	0.230	0.008	0.0027	
480 minute summer	S11	1.002	S14	0.1	0.322	0.001	0.0028	3.0

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Results for 100 year +20% CC 600 minute summer. 840 minute analysis at 15 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
600 minute summer	S13	15	55.170	0.000	0.0	0.0000	0.0000	OK
600 minute summer	S12	15	55.099	0.000	0.0	0.0000	0.0000	OK
600 minute summer	S8	315	55.776	0.016	0.3	0.0057	0.0000	OK
600 minute summer	S9	435	55.755	0.062	0.3	0.0056	0.0000	OK
600 minute summer	S10	435	55.755	0.090	0.5	0.1064	0.0000	OK
600 minute summer	S1	315	55.776	0.016	0.3	0.0032	0.0000	OK
600 minute summer	S2	435	55.755	0.094	0.3	0.1060	0.0000	OK
600 minute summer	S3	435	55.755	0.119	0.8	0.1349	0.0000	OK
600 minute summer	S4	435	55.754	0.777	0.8	2.4020	0.0000	SURCHARGED
600 minute summer	S5	435	55.755	0.794	0.2	0.8982	0.0000	SURCHARGED
600 minute summer	S11	435	54.789	0.008	0.1	0.0088	0.0000	OK
600 minute summer	S14	435	54.701	0.004	0.1	0.0000	0.0000	OK

Link Event	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
600 minute summer	S13	1.000	S12	0.0	0.000	0.000	0.0000	
600 minute summer	S12	1.001	S11	0.0	0.000	0.000	0.0074	
600 minute summer	S8	2.000	S9	0.3	0.297	0.024	0.0476	
600 minute summer	S9	2.001	S10	0.3	0.248	0.024	0.0493	
600 minute summer	S10	2.002	S3	0.5	0.286	0.040	0.0749	
600 minute summer	S1	3.000	S2	0.3	0.296	0.024	0.1175	
600 minute summer	S2	3.001	S3	0.3	0.212	0.024	0.0616	
600 minute summer	S3	2.003	S4	0.8	0.399	0.064	0.0245	
600 minute summer	S4	2.004	S5	0.2	0.021	0.019	0.0574	
600 minute summer	S5	2.005	S11	0.1	0.229	0.008	0.0027	
600 minute summer	S11	1.002	S14	0.1	0.322	0.001	0.0028	3.3

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Results for 100 year +20% CC 720 minute summer. 960 minute analysis at 15 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
720 minute summer	S13	15	55.170	0.000	0.0	0.0000	0.0000	OK
720 minute summer	S12	15	55.099	0.000	0.0	0.0000	0.0000	OK
720 minute summer	S8	345	55.773	0.013	0.2	0.0047	0.0000	OK
720 minute summer	S9	510	55.744	0.051	0.2	0.0045	0.0000	OK
720 minute summer	S10	510	55.743	0.078	0.3	0.0925	0.0000	OK
720 minute summer	S1	345	55.773	0.013	0.2	0.0026	0.0000	OK
720 minute summer	S2	510	55.743	0.082	0.2	0.0932	0.0000	OK
720 minute summer	S3	510	55.744	0.108	0.5	0.1216	0.0000	OK
720 minute summer	S4	510	55.744	0.767	0.5	2.4020	0.0000	SURCHARGED
720 minute summer	S5	510	55.743	0.782	0.2	0.8846	0.0000	SURCHARGED
720 minute summer	S11	510	54.789	0.008	0.1	0.0088	0.0000	OK
720 minute summer	S14	510	54.701	0.004	0.1	0.0000	0.0000	OK

Link Event	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
720 minute summer	S13	1.000	S12	0.0	0.000	0.000	0.0000	
720 minute summer	S12	1.001	S11	0.0	0.000	0.000	0.0074	
720 minute summer	S8	2.000	S9	0.2	0.263	0.016	0.0364	
720 minute summer	S9	2.001	S10	0.2	0.228	0.016	0.0400	
720 minute summer	S10	2.002	S3	0.3	0.242	0.024	0.0654	
720 minute summer	S1	3.000	S2	0.2	0.263	0.016	0.1007	
720 minute summer	S2	3.001	S3	0.2	0.198	0.016	0.0541	
720 minute summer	S3	2.003	S4	0.5	0.350	0.040	0.0224	
720 minute summer	S4	2.004	S5	0.2	0.021	0.016	0.0574	
720 minute summer	S5	2.005	S11	0.1	0.228	0.008	0.0027	
720 minute summer	S11	1.002	S14	0.1	0.321	0.001	0.0027	3.6

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Results for 100 year +20% CC 960 minute summer. 1200 minute analysis at 15 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m^3)	Flood (m^3)	Status
960 minute summer	S13	15	55.170	0.000	0.0	0.0000	0.0000	OK
960 minute summer	S12	15	55.099	0.000	0.0	0.0000	0.0000	OK
960 minute summer	S8	465	55.773	0.013	0.2	0.0047	0.0000	OK
960 minute summer	S9	630	55.774	0.081	0.2	0.0073	0.0000	OK
960 minute summer	S10	630	55.773	0.108	0.3	0.1279	0.0000	OK
960 minute summer	S1	630	55.773	0.013	0.2	0.0027	0.0000	OK
960 minute summer	S2	630	55.774	0.113	0.2	0.1276	0.0000	OK
960 minute summer	S3	645	55.773	0.137	0.5	0.1549	0.0000	OK
960 minute summer	S4	645	55.774	0.797	0.5	2.4020	0.0000	SURCHARGED
960 minute summer	S5	630	55.773	0.812	0.4	0.9185	0.0000	SURCHARGED
960 minute summer	S11	645	54.789	0.008	0.1	0.0088	0.0000	OK
960 minute summer	S14	645	54.701	0.004	0.1	0.0000	0.0000	OK

Link Event	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m^3)	Discharge Vol (m^3)
960 minute summer	S13	1.000	S12	0.0	0.000	0.000	0.0000	
960 minute summer	S12	1.001	S11	0.0	0.000	0.000	0.0074	
960 minute summer	S8	2.000	S9	0.2	0.263	0.016	0.0700	
960 minute summer	S9	2.001	S10	0.2	0.228	0.016	0.0642	
960 minute summer	S10	2.002	S3	0.3	0.242	0.024	0.0875	
960 minute summer	S1	3.000	S2	0.2	0.263	0.016	0.1490	
960 minute summer	S2	3.001	S3	0.2	0.198	0.016	0.0722	
960 minute summer	S3	2.003	S4	0.5	0.350	0.040	0.0273	
960 minute summer	S4	2.004	S5	0.4	0.021	0.029	0.0574	
960 minute summer	S5	2.005	S11	0.1	0.230	0.008	0.0027	
960 minute summer	S11	1.002	S14	0.1	0.322	0.001	0.0028	4.3

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Results for 100 year +20% CC 1440 minute summer. 1680 minute analysis at 30 minute timestep. Mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
1440 minute summer	S13	30	55.170	0.000	0.0	0.0000	0.0000	OK
1440 minute summer	S12	30	55.099	0.000	0.0	0.0000	0.0000	OK
1440 minute summer	S8	870	55.770	0.010	0.1	0.0034	0.0000	OK
1440 minute summer	S9	930	55.706	0.013	0.1	0.0012	0.0000	OK
1440 minute summer	S10	930	55.706	0.041	0.2	0.0486	0.0000	OK
1440 minute summer	S1	600	55.770	0.010	0.1	0.0019	0.0000	OK
1440 minute summer	S2	930	55.706	0.045	0.1	0.0511	0.0000	OK
1440 minute summer	S3	930	55.706	0.070	0.3	0.0794	0.0000	OK
1440 minute summer	S4	930	55.706	0.729	0.3	2.4020	0.0000	SURCHARGED
1440 minute summer	S5	930	55.706	0.745	0.2	0.8428	0.0000	SURCHARGED
1440 minute summer	S11	930	54.789	0.008	0.1	0.0087	0.0000	OK
1440 minute summer	S14	930	54.701	0.004	0.1	0.0000	0.0000	OK

Link Event	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
1440 minute summer	S13	1.000	S12	0.0	0.000	0.000	0.0000	
1440 minute summer	S12	1.001	S11	0.0	0.000	0.000	0.0073	
1440 minute summer	S8	2.000	S9	0.1	0.212	0.008	0.0071	
1440 minute summer	S9	2.001	S10	0.1	0.212	0.008	0.0129	
1440 minute summer	S10	2.002	S3	0.2	0.225	0.016	0.0345	
1440 minute summer	S1	3.000	S2	0.1	0.212	0.008	0.0459	
1440 minute summer	S2	3.001	S3	0.1	0.187	0.008	0.0286	
1440 minute summer	S3	2.003	S4	0.3	0.309	0.024	0.0138	
1440 minute summer	S4	2.004	S5	0.2	0.014	0.012	0.0574	
1440 minute summer	S5	2.005	S11	0.1	0.227	0.008	0.0026	
1440 minute summer	S11	1.002	S14	0.1	0.321	0.001	0.0027	4.9

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APPENDIX C

IRISH WATER CONFIRMATION OF FEASIBILITY

Ìan Connolly

Cashel Business Centre
Cashel Road, Kimmage
Dublin
Dublin
d12et25

Uisce Éireann
Bosca OP 448
Oifig Sheachadta na
Cathrach Theas
Cathair Chorcaí

Irish Water
PO Box 448,
South City
Delivery Office,
Cork City.

www.water.ie

3 September 2021

Re: CDS21003208 pre-connection enquiry - Subject to contract | Contract denied

Connection for Single Domestic of 1 unit(s) at 46A Limekiln Road, Terenure, Terenure, Dublin

Dear Sir/Madam,

Irish Water has reviewed your pre-connection enquiry in relation to a Water & Wastewater connection at 46A Limekiln Road, Terenure, Terenure, Dublin (the **Premises**). Based upon the details you have provided with your pre-connection enquiry and on our desk top analysis of the capacity currently available in the Irish Water network(s) as assessed by Irish Water, we wish to advise you that your proposed connection to the Irish Water network(s) can be facilitated at this moment in time.

SERVICE	**OUTCOME OF PRE-CONNECTION ENQUIRY** **THIS IS NOT A CONNECTION OFFER. YOU MUST APPLY FOR A CONNECTION(S) TO THE IRISH WATER NETWORK(S) IF YOU WISH TO PROCEED.**
Water Connection	Feasible without infrastructure upgrade by Irish Water
Wastewater Connection	Feasible without infrastructure upgrade by Irish Water
SITE SPECIFIC COMMENTS	
The design and construction of the Water & Wastewater pipes and related infrastructure to be installed in this development shall comply with the Irish Water Connections and Developer Services Standard Details and Codes of Practice that are available on the Irish Water website. Irish Water reserves the right to supplement these requirements with Codes of Practice and these will be issued with the connection agreement.	

Stiúrthóirí / Directors: Cathal Marley (Chairman), Niall Gleeson, Eamon Gallen, Yvonne Harris, Brendan Murphy, Maria O'Dwyer
Oifig Chláraithe / Registered Office: Teach Colvill, 24-26 Sráid Thalbóid, Baile Átha Cliath 1, D01 NP86 / Colvill House, 24-26 Talbot Street, Dublin 1, D01 NP86
Is cuideachta ghníomhaíochta ainmnithe atá faoi theorainn scaireanna é Uisce Éireann / Irish Water is a designated activity company, limited by shares.
Uimhir Chláraithe in Éirinn / Registered in Ireland No.: 530363

General Notes:

1) The initial assessment referred to above is carried out taking into account water demand and wastewater discharge volumes and infrastructure details on the date of the assessment. **The availability of capacity may change at any date after this assessment.**
2) This feedback does not constitute a contract in whole or in part to provide a connection to any Irish Water infrastructure. All feasibility assessments are subject to the constraints of the Irish Water Capital Investment Plan.
3) The feedback provided is subject to a Connection Agreement/contract being signed at a later date.
4) A Connection Agreement will be required to commencing the connection works associated with the enquiry this can be applied for at https://www.water.ie/connections/get-connected/
5) A Connection Agreement cannot be issued until all statutory approvals are successfully in place.
6) Irish Water Connection Policy/ Charges can be found at https://www.water.ie/connections/information/connection-charges/
7) Please note the Confirmation of Feasibility does not extend to your fire flow requirements.
8) Irish Water is not responsible for the management or disposal of storm water or ground waters. You are advised to contact the relevant Local Authority to discuss the management or disposal of proposed storm water or ground water discharges
9) To access Irish Water Maps email datarequests@water.ie
10) All works to the Irish Water infrastructure, including works in the Public Space, shall have to be carried out by Irish Water.

If you have any further questions, please contact Paul Lowry from the design team on 018230377 or email paullowr@water.ie. For further information, visit **www.water.ie/connections.**

Yours sincerely,

Yvonne Harris

Yvonne Harris
Head of Customer Operations

APPENDIX D

DRAWINGS