

**Link Road to Clonlara Road, Baldonnell
Business Park, Dublin 22.**

Engineering Planning Report
212126-PUNCH-XX-XX-RP-C-001

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1 Introduction

This report was prepared to accompany a planning application for the proposed Link Road to Clonlara Road, Baldonnell Business Park, Dublin 22. This report deals specifically with the surface water drainage, foul water drainage, watermain design and roads design for the planning application. This report has been prepared with reference to the “Greater Dublin Regional Code of Practice for Drainage Works”, “Greater Dublin Strategic Drainage Study” and the “Irish Water Code of Practice for Wastewater Infrastructure”.

The subject site has an area of approximately 0.083 Ha and the proposed road is circa 54m long. The proposed site is located on agricultural lands. It is bounded by existing and under construction logistics/warehouse developments to the north and east, and agricultural/ongoing construction works to the west and south. The River Camac flows parallel to the proposed road. The topography of the site is relatively flat.

Access to the development will be via the existing private road (Clonlara Road) within the Baldonnell Business Park.

The site location is shown in Figure 1-1 below.

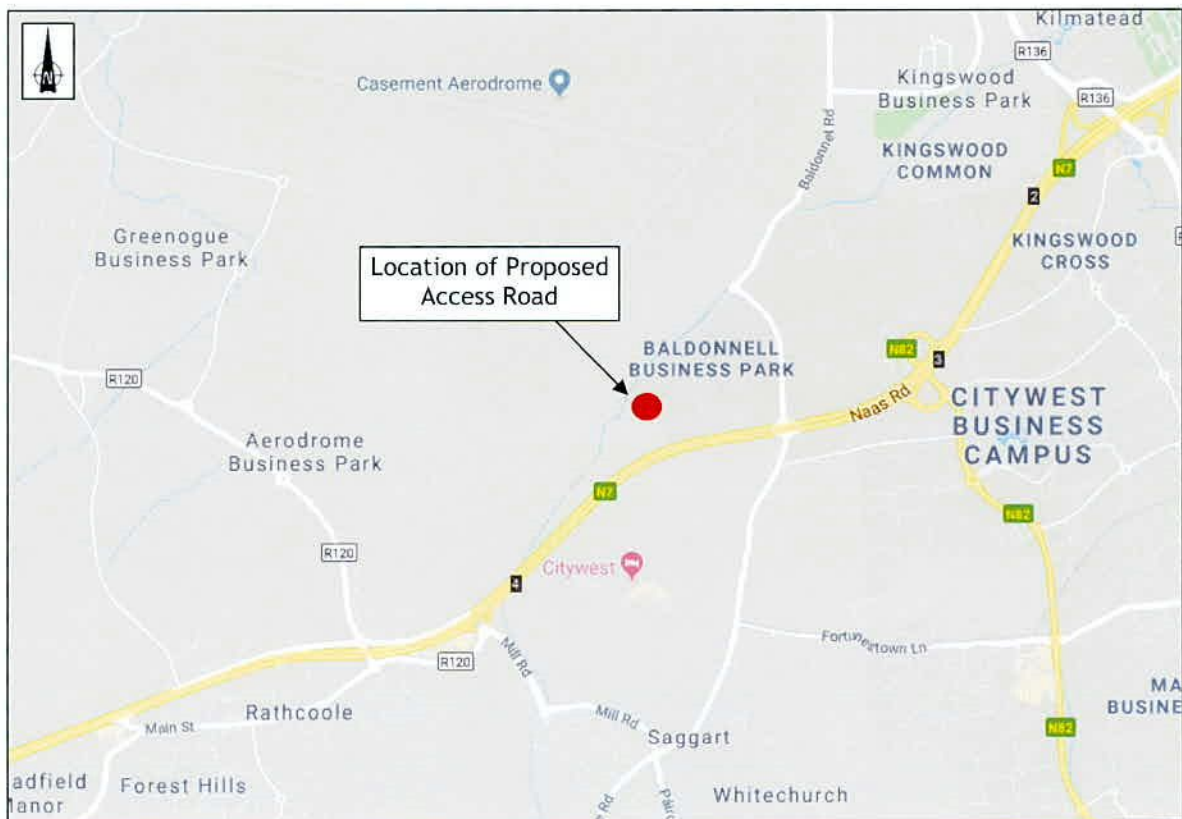


Figure 1-1: Site Location of the Proposed Development (© Google maps)

1.1 Proposed Development

The proposed development consists of the construction of a single carriage circa 54m long 2-way access road and footpath, along with foul and surface water sewer networks which will serve future developments located to the southwest of the ongoing development.

The proposed works are outlined in a series of engineering drawings prepared by PUNCH Consulting Engineers as well as landscape drawings produced by CSR Landscape Architects. This documentation is supplied as part of the planning documentation.

2 Stormwater Drainage Design

2.1 Existing Stormwater Drainage

2.1.1 Public Surface Water Sewerage

Record and survey drawings provided indicate no public surface water drainage adjacent to or within the development site. Please refer to Irish Water existing records in Appendix A.

The River Camac flows alongside to the proposed road on the northern side.

2.2 Proposed Stormwater Drainage

The proposed surface water drainage system has been designed using Causeway Flow software in accordance with the Department of Environment and Local Government's guidance document "Recommendations for Site Development Works for Housing Areas", with guidance taken from the "Greater Dublin Strategic Drainage Study" (GSDSDS) and the South Dublin County Council Development Plan.

A new surface water sewer network shall be provided for the proposed road and path which will be entirely separated from any foul water sewer network. All surface water run-off from hardstanding areas are designed to be collected by a gravity pipe network and will discharge to the River Camac north of the road. Please refer to PUNCH drawings illustrating the proposed stormwater drainage arrangement. refer PUNCH drawing 212126-PUN-XX-XX-DR-C-0100

Attenuation is proposed through the use of oversized pipes for the small scale network proposed.

The proposed network will discharge stormwater from the road and pathway into the River Camac via a headwall. A manhole will be located prior to the headwall with a hydraulic vortex flow controller (e.g. Hydrobrake) to limit outflow.

The proposed stormwater sewers have been designed using Causeway Flow software. Table 2-1 describes the stormwater drainage design parameters used and detailed calculations are enclosed in Appendix B.

Inland Fisheries Ireland have been consulted with regard to the design, and have provided positive feedback. Please refer correspondence in Appendix D.

Please refer PUNCH drawing 212126-PUN-XX-XX-DR-C-0100 for drainage design.

Description	Value
Total Impervious Site area drained by new network	0.083 Ha (road and footpath)
Return period target	Pipe Design 1 in 5 year. Network Design 1 in 30 year + CC. Check 1 in 100 year + CC for flooding.
Climate Change	20%
M5-60	18.7
Ratio R	0.271
SOIL type	4 (clayey)
Soil value	0.45
SAAR	808mm
Flow reduction parameter	2 l/s
Qbar value per hectare	0.5 l/s
Controlled Outflow	2 l/s
Flow restriction method	Hydraulic vortex flow controller
Attenuation Storage Volume	Pipe storage volume
Infiltration Rate	N/A

Table 2-1: Stormwater Drainage Design Parameters

2.2.1 Causeway Flow Modelling - General

The proposed surface water drainage system has been designed using Causeway Flow software in accordance with the Department of Environment and Local Government's guidance document "Recommendations for Site Development Works for Housing Areas", with guidance taken from the "Greater Dublin Strategic Drainage Study" (GSDS) and the South Dublin County Council Development Plan.

The model has analysed a range of storms at the 1% AEP (1 in 100-year return period storm), with a 20% additional rainfall to allow for climate change.

The network has been modelled with the associated vortex flow controller (e.g. Hydrobrake) outlet included. Attenuation is provided solely by the oversized pipes and manholes in the proposed network.

No separate attenuation tank is included. Causeway includes a design setting called "additional storage". This is included in the software to account for storage volume in the network provided by secondary drainage including access junctions, inspection chambers, service connections etc.

Depths of water in the network model (including pipework, manholes, the attenuation tanks and vortex flow controllers) have been assessed for surcharging and flood risk. The model is established such that a flood risk is identified in the model results if the water rises to within 300mm of the cover level. If the water level rises to a level below this, it is identified as a surcharge within the model results. It is important to note that this warning is given related to proposed ground level at the node (not adjacent floor level).

Please refer to detailed Causeway calculations (inputs and outputs) enclosed in Appendix B for details.

2.2.2 Causeway Flow - Area Contribution

Causeway flow does not allow for different surfaces to contribute to the drainage network at different runoff rates. Thus the road and pathway are combined as one single contributing impervious area. The area is approximately 0.083 ha.

Only the proposed new road area is to be drained by the proposed surface water network. Existing road areas being modified slightly with road marking do not contribute to the proposed new surface water drainage network, and are serviced separately by existing networks.

Please refer to PUNCH drawing 212126-PUN-XX-XX-DR-C-0150 for extent of new proposed impervious asphalt and footpath areas along the new road extension.

2.2.3 Rainfall Data

A value for the SAAR for the site has been obtained from the Met Éireann website. The SAAR value used was 808mm.

The following rainfall parameters have been utilised in the Causeway Flow model: M5-60 of 18.7mm and a Ratio (R) of 0.271. These figures have been taken from Met Éireann Rainfall Data, refer to Appendix B for rainfall data sheet.

2.2.4 Geotechnical & Soils

The GSI quaternary map was reviewed and an extract from this map is shown in Figure 6. This indicates the area to be 'Till derived from limestones.'

Based on the above, a soil value of 4 (soil index = 0.45) was used for the design which characteristics the soil as 'Clayey, poorly drained'.

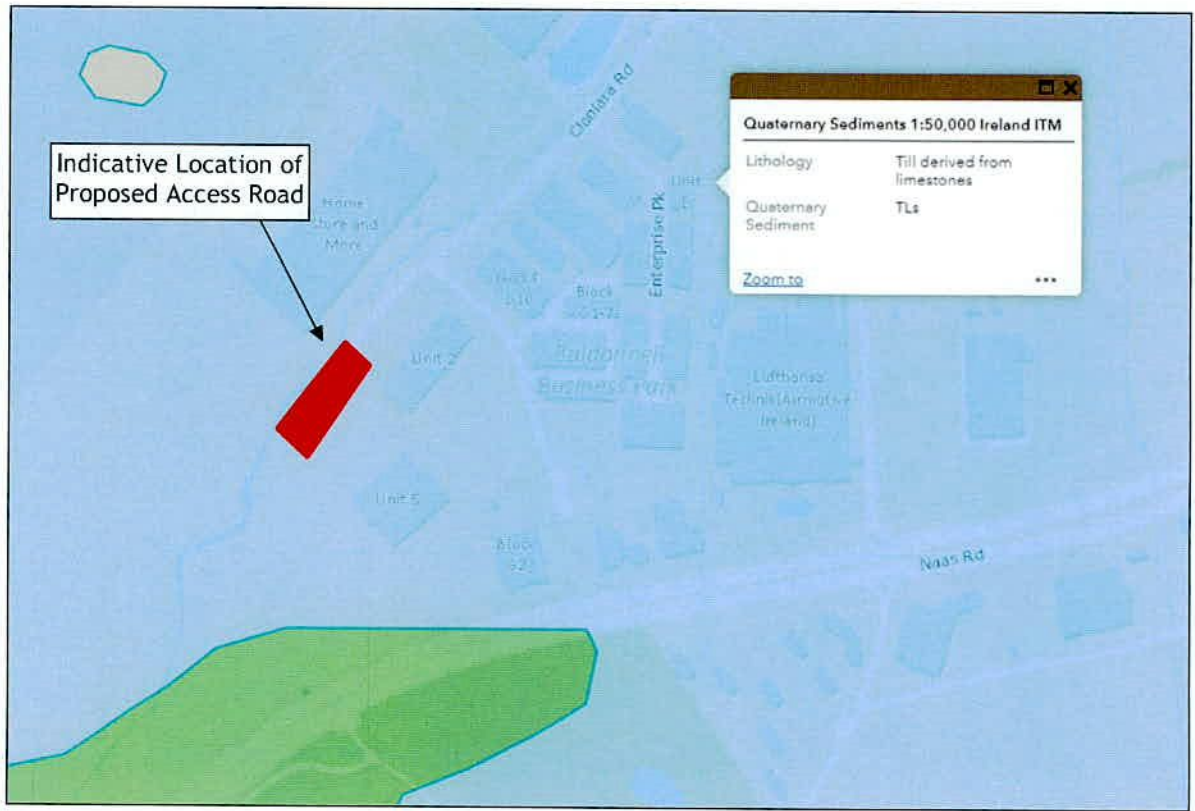


Figure 2-1: Extract from GSI Quaternary Map

2.2.5 Qbar Calculation

The following values have been used to calculate Qbar:

- SAAR = 808 mm (refer to section 2.2.3)
- SOIL = 0.45 (refer to section 2.2.4)
- Area of Site = 0.083 ha (refer to section 2.2.2)

To establish Qbar for a site less than 50 ha, Qbar for 50 ha is calculated, and then proportionately reduced to the actual site area.

Refer below for Qbar calculation:

Qbar for 50Ha:

$$Qbar(50Ha) = 0.00108 \times AREA^{0.89} \times SAAR^{1.17} \times SOIL^{2.17}$$

$$Qbar(50Ha) = 0.00108 \times 0.50^{0.89} \times 808^{1.17} \times 0.45^{2.17} = 259.811/s$$

Qbar per Hectare:

Proportionate Qbar for 10,000m²:

$$Qbar(site) = \frac{Qbar(50Ha) \times Site\ area}{50,000}$$

$$Qbar (site) = \frac{259.81 \times 10,000}{500,000} = 5.20 \text{ l/s}$$

This results in a Qbar value of 5.20 l/s/Ha

Qbar for Impervious Catchment

Proportionate Qbar for 830m²:

$$Qbar (site) = \frac{Qbar(50Ha) \times Site \text{ area}}{500,000}$$

$$Qbar (site) = \frac{259.81 \times 830}{500,000} = 0.5 \text{ l/s}$$

This results in a Qbar value of 0.5 l/s

This excessively low Qbar would result in increased risk of blockage at the flow control. As a result, it is proposed to limit the surface water discharge to 2l/s only.

2.2.6 Attenuation and Flow Control

It is proposed to attenuate all surface water runoff from impervious areas (i.e.. road and pathway) using the storage capacity within oversized pipes and manholes. The outlet flow will be controlled by a vortex flow controller. Allowance has been made for flood levels at the discharge outlet as advised by the flood risk consultant, RPS. The location of discharge corresponds closely to RPS flood model BAL_23 level of 97.453, and this level has been taken at the headwall discharge.

The storage has been sized to attenuate the 1:100-year return period storm event, plus 20% climate change. The storage has been modelled as part of a stormwater drainage network system in Causeway Flow with its discharge limited by a vortex flow controller. As the site covers a very small area, Qbar is very small. The vortex flow controller would require a very small opening in order to limit the discharge rate to the value of Qbar. This is likely to cause issues of blockages occurring.

It is proposed to limit the discharge to the existing river to 2.0l/s.

Please refer PUNCH drawing 212126-PUN-XX-XX-DR-C-0100 for drainage design. Please refer documentation provided by RPS for all flood assessments.

2.3 SUDs Proposals

In summary, the proposed SuDS systems for the site comprise:

- External on grade soft landscape areas
- Landscaped swale alongside road

SUDS measures proposed as part of this development have been designed taking guidance from CIRIA Publications C644 - "Building Greener" and Ciria C697 - "The SUDS Manual". Reference is also made to the recently released South Dublin County Council 'Sustainable Drainage explanatory design and Evaluation Guide, 2022.'

Please see PUNCH drawing 212126-PUN-XX-XX-DR-C-0150 for the SUDS plan.

2.3.1 Proposed Landscaping

A significant area of the site will have landscaping. This will be a mix of proposed and existing landscape areas with some large existing trees retained.

Landscaping adjacent to the river will indirectly take surface water by evapotranspiration. Please refer to landscape documentation for details.

2.3.2 Swale Landscape Areas

The majority of the development is to discharge to a proposed swale area adjacent to the proposed new road. At low flow situations, the majority of runoff will remain within the soil along the bottom of the swale and will be treated. Surface water treatment in this situation is provided primarily by evapotranspiration.

The swales are proposed to be grassed.

Any high flow surface water would build up and discharge to proposed gullies within the swales.

Surface water is discharged to the swale using a beany kerb combined kerb and drainage system (or equivalent) with swale discharge headwall outlets connecting to the swale.

Please see PUNCH drawing 212126-PUN-XX-XX-DR-C-0150 for the SUDS plan. Please refer to landscape documentation for detail so f proposed planting.

2.3.3 SUDS Pillars

The design will implement the four Sustainable urban Drainage pillars as summarised below

Water Quantity

Surface water quantity is attenuated by the provision of oversized drainage pipes.

Water Quality

Short term duration storms are treated within the grassed swale by evapotranspiration, improving water **quality**

Amenity

The proposed landscaping including trees will provide an amenity to the development. Please refer to landscape documentation for planting details.

Biodiversity

The proposed landscape design will provide a biodiversity benefit. The various natural plants that will grow in the swalw will also provide for biodiversity. Please refer to landscape documentation for planting details.

3 Foul Water Drainage Design

3.1 Existing Foul Water Drainage

Based on available Irish Water and site survey records, the following public foul water drainage exists:

- A 675mm diameter foul sewer on the opposite side of the River Camac to the north, continuing north eastward .
- A 225mm diameter connection towards the proposed site as indicated on a Roghan O'Donovan (ROD) records.

Please refer to Appendix A for Irish Water Record Drawings and Roghan O'Donovan record drawings illustrating the existing foul water drainage arrangement. An extract from the Irish Water drawing is shown in Figure 3-1. An extract from the site records by Roghan O'Donovan is shown in .

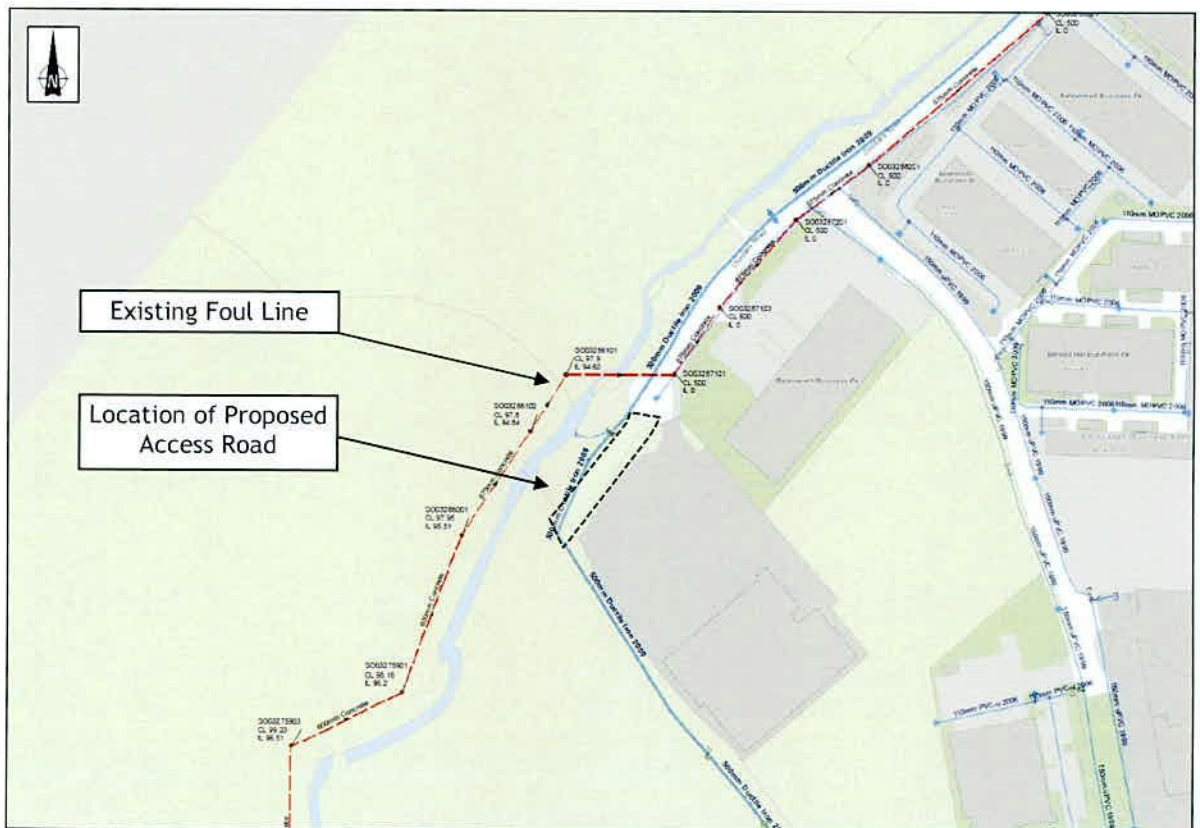


Figure 3-1: Existing foul drainage surrounding the site (Extract from Irish Water records)

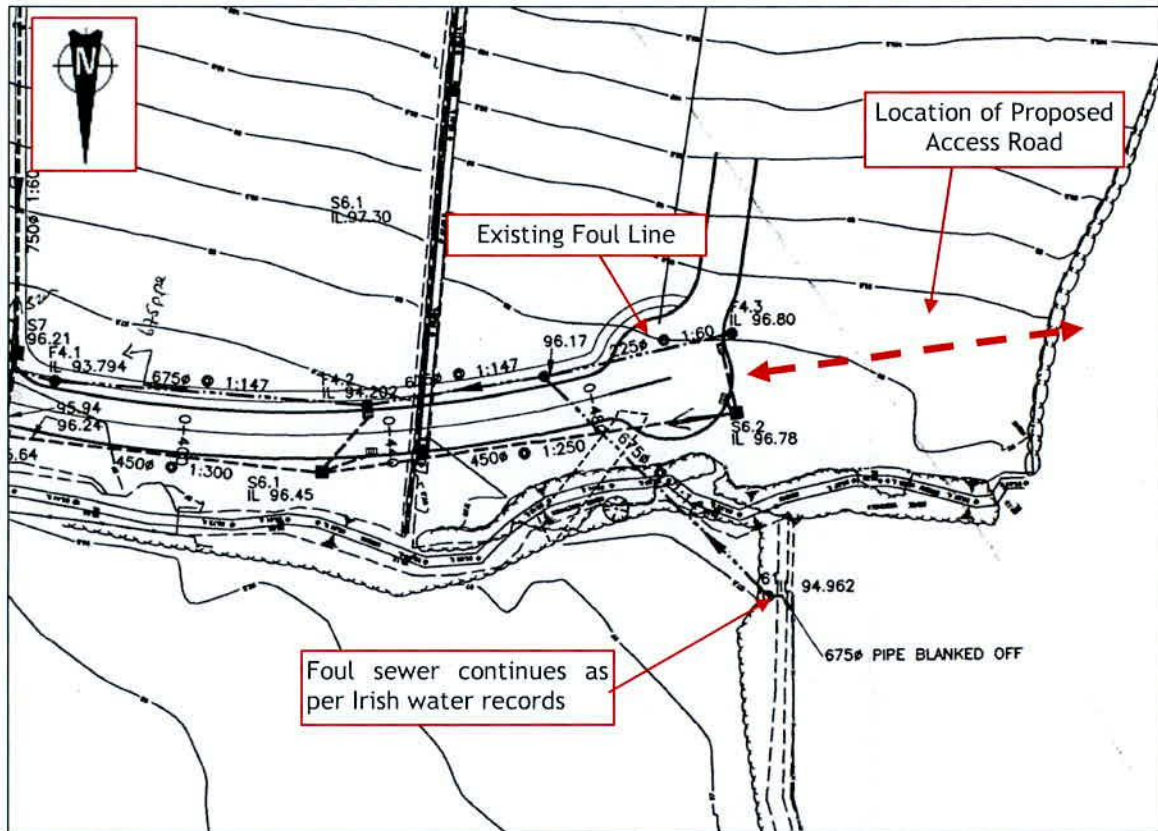


Figure 3-2: Existing foul drainage surrounding the site (Extract from ROD Site Survey)

3.2 Proposed Foul Water Drainage

Foul water drainage design is provided for the portion of the site for which a planning application is to be applied for, as outlined in the introduction above.

It is proposed to provide a new 150mm diameter gravity drainage sewer to facilitate future development. The new foul sewer will not be connected to the existing network. The design will permit a future connection to development at the upstream end and future connection to discharge at the downstream end. The downstream end will be directly adjacent to the existing manhole at the upstream end of the existing 225mm diameter foul sewer. The design will facilitate a soffit to soffit connection.

Foul water drainage has been designed with reference to the following documentation:

- *“Recommendations for Site Development Works for Housing Areas”* published by DOE
- *“Code of Practice for Wastewater Infrastructure”* published by Irish Water - particularly Appendix D - Wastewater Flow Rates for Design
- *“Greater Dublin Regional Code of Practice for Drainage Works”*
- *“Design Recommendations for Multi-storey and Underground Car Parks”* published by the Institution of Structural Engineers.

The exact arrangement of foul drainage constructed may not match exactly the arrangement proposed at planning, however the principles will be implemented.

The following wastewater characteristics have been taken:

- 150mm diameter
- 1:100 gradient

A pre connection application has been made to Irish Water for the proposed development. Please refer to Appendix D for the confirmation of feasibility.

Please refer to PUNCH drawing 212126-PUN-XX-XX-DR-C-0100 illustrating the proposed foul water drainage arrangement.

4 Watermain Design

4.1 Existing Watermain

4.1.1 Existing Public Water Infrastructure

The following existing Irish Water public watermain exists adjacent to the development:

- A 500 mm diameter DI watermain, which cuts centrally through the site
- An existing 200mm watermain directly to the north east

Please refer to Appendix A for Irish Water Record Drawings as well as Roghan O Donavan records illustrating the existing watermain arrangement in the area. An extract is shown in above.

4.1.2 Existing On site, Private Water Infrastructure

There is no existing on-site private water infrastructure.

4.2 Proposed Watermain

4.2.1 General

Water demands are developed on the basis of foul water demands. Design has been developed with reference to the following documentation:

- *"Recommendations for Site Development Works for Housing Areas"* published by DOE
- *"Code of Practice for Wastewater Infrastructure"* published by Irish Water - particularly Appendix D - *Wastewater Flow Rates for Design*
- *"Code of Practice for Water Infrastructure"* published by Irish Water - particularly Appendix D - *Wastewater Flow Rates for Design*

A pre connection application has been made to Irish Water for the proposed development. Please refer to Appendix D for the confirmation of feasibility.

4.2.2 Proposed Water Supply Network

A 200mm watermain is proposed to enable a future water supply connection to future development south of the new access road. It is not proposed to connect the proposed development to the existing 200mm diameter watermain located at the roundabout on Clonlara Road. Once a future development is understood, the connection would be applied for.

Please refer to PUNCH drawing 212126-PUN-XX-XX-DR-C-0100 illustrating the proposed watermain.

5 Roads and Access

5.1 Proposed Roads & Access

5.1.1 General

The proposed access road consists of a single carriage 2-way access road, and footpath on one side. There are dropped kerbs for pedestrians at the northern (roundabout) side. The road terminates at the red line boundary. Any existing kerbs and footpaths will be removed prior to construction.

The proposed roads layout was designed in accordance with the Design Manual for Urban Roads and Streets (DMURS) and the Recommendations for Site Development Works.

5.1.2 Sightlines and Autotrack Demonstrations

Sight lines at all/main junctions were designed in accordance with DMURS based on existing speed limits on the main road.

Autotrack assessments were carried out on the proposed road network and demonstrate that a fire tender can safely negotiate the proposed road network and turning heads.

5.1.3 Road Safety Audit

A Road Safety Audit has been undertaken for the road design, and comments provided have been incorporated into the design. Refer to Road Safety Audit provided by Bruton and Associates.

The comments identified as well as how each have been addressed are summarised below:

Item reference section in Audit	Summary Description	Means of Resolving
3.1	Gully ponding at crossing points	Gullies provided upstream of pedestrian crossings
3.2	Opposing tactile paving alignment	Opposing tactile paving aligned to each other
3.3	Yield signs omitted	Yield signs added
3.4	Inadequate space for truck at Caulfield Access to allow vehicles to pass	Increased space provided for truck to wait and allow vehicles to pass

Table 5-1: Road Safety Audit responses

5.1.4 Interim design

The proposed road is a dead end to service a future development site. To address the interim situation where the land is not developed, delineator bollards are proposed along the road edge.

Please refer PUNCH drawing 212126-PUN-XX-XX-DR-C-0403

5.1.5 Drawing References

Please refer to PUNCH drawing 212126-PUN-XX-XX-DR-C-0400, 212126-PUN-XX-XX-DR-C-0401. 212126-PUN-XX-XX-DR-C-0402 for a detail layout of the proposed road arrangement.

Please refer PUNCH drawing 212126-PUN-XX-XX-DR-C-0600, 212126-PUN-XX-XX-DR-C-0601 for autotrack drawings.

Please refer PUNCH drawing 212126-PUN-XX-XX-DR-C-0624 and 212126-PUN-XX-XX-DR-C-0625 for sightline drawings

Appendix A Existing Record Drawings

Appendix B Supporting Drainage Information

Met Eireann
Return Period Rainfall Depths for sliding Durations
Irish Grid: Easting: 303671, Northing: 228124,

DURATION	Interval		Years													
	6months,	1year,	2,	3,	4,	5,	10,	20,	30,	50,	75,	100,	150,	200,	250,	500,
5 mins	2.4,	3.6,	4.3,	5.3,	6.0,	6.6,	8.5,	10.7,	12.2,	14.4,	16.4,	17.9,	20.3,	22.3,	23.9,	N/A
10 mins	3.4,	5.0,	6.0,	7.4,	8.4,	9.2,	11.8,	14.9,	17.0,	20.0,	22.8,	25.0,	28.3,	31.0,	33.3,	N/A
15 mins	4.0,	5.9,	7.0,	8.7,	9.9,	10.8,	13.9,	17.6,	20.0,	23.6,	26.8,	29.4,	33.3,	36.5,	39.1,	N/A
30 mins	5.2,	7.7,	9.1,	11.2,	12.7,	13.9,	17.8,	22.3,	25.4,	29.8,	33.8,	36.9,	41.8,	45.6,	48.8,	N/A
1 hours	6.9,	10.0,	11.8,	14.5,	16.4,	17.8,	22.7,	28.4,	32.2,	37.6,	42.5,	46.3,	52.3,	57.0,	60.9,	N/A
2 hours	9.0,	13.1,	15.3,	18.7,	21.1,	22.9,	29.0,	36.0,	40.7,	47.4,	53.5,	58.2,	65.5,	71.3,	76.1,	N/A
3 hours	10.6,	15.3,	17.8,	21.8,	24.4,	26.5,	33.5,	41.5,	46.8,	54.4,	61.2,	66.5,	74.8,	81.2,	86.6,	N/A
4 hours	11.8,	17.0,	19.9,	24.2,	27.1,	29.4,	37.0,	45.8,	51.6,	59.9,	67.3,	73.1,	82.1,	89.1,	95.0,	N/A
6 hours	13.9,	19.9,	23.1,	28.1,	31.4,	34.1,	42.7,	52.7,	59.3,	68.6,	77.0,	83.5,	93.7,	101.5,	108.1,	N/A
9 hours	16.3,	23.2,	26.9,	32.6,	36.4,	39.4,	49.3,	60.6,	68.1,	78.7,	88.1,	95.5,	106.8,	115.7,	123.1,	N/A
12 hours	18.2,	25.9,	30.0,	36.2,	40.5,	43.8,	54.6,	66.9,	75.1,	86.6,	96.9,	104.9,	117.3,	126.9,	134.9,	N/A
18 hours	21.4,	30.2,	34.9,	42.1,	46.9,	50.7,	63.0,	77.0,	86.2,	99.3,	110.9,	119.9,	133.8,	144.6,	153.6,	N/A
24 hours	23.9,	33.7,	38.9,	46.8,	52.1,	56.2,	69.7,	85.0,	95.1,	109.4,	122.0,	131.8,	146.9,	158.7,	168.4,	202.6,
2 days	30.1,	41.2,	47.0,	55.6,	61.4,	65.8,	80.2,	96.1,	106.5,	121.0,	133.7,	143.5,	158.5,	170.0,	179.5,	212.5,
3 days	35.2,	47.3,	53.6,	62.8,	68.9,	73.6,	88.7,	105.2,	116.0,	130.8,	143.8,	153.7,	168.8,	180.4,	189.9,	222.7,
4 days	39.6,	52.6,	59.3,	69.0,	75.4,	80.4,	96.1,	113.2,	124.3,	139.5,	152.7,	162.8,	178.1,	189.8,	199.4,	232.3,
6 days	47.4,	61.8,	69.1,	79.8,	86.8,	92.1,	108.9,	127.0,	138.6,	154.5,	168.2,	178.7,	194.4,	206.4,	216.1,	249.5,
8 days	54.2,	69.9,	77.8,	89.2,	96.6,	102.3,	120.0,	139.0,	151.1,	167.6,	181.8,	192.5,	208.6,	220.9,	230.9,	264.8,
10 days	60.5,	77.3,	85.7,	97.8,	105.6,	111.5,	130.0,	149.9,	162.4,	179.4,	194.0,	205.0,	221.5,	234.0,	244.2,	278.6,
12 days	66.5,	84.2,	93.1,	105.7,	113.9,	120.0,	139.3,	159.8,	172.7,	190.2,	205.2,	216.5,	233.3,	246.1,	256.4,	291.4,
16 days	77.4,	96.9,	106.5,	120.2,	129.0,	135.7,	156.2,	178.0,	191.6,	209.9,	225.5,	237.3,	254.8,	268.0,	278.6,	314.5,
20 days	87.6,	108.6,	118.9,	133.5,	142.9,	149.9,	171.6,	194.4,	208.6,	227.7,	243.9,	256.1,	274.1,	287.7,	298.7,	335.4,
25 days	99.5,	122.2,	133.3,	148.9,	158.9,	166.3,	189.3,	213.3,	228.1,	248.1,	264.9,	277.5,	296.2,	310.2,	321.5,	359.2,

NOTES:

N/A Data not available

These values are derived from a Depth Duration Frequency (DDF) Model

For details refer to:

'Fitzgerald D. L. (2007), Estimates of Point Rainfall Frequencies, Technical Note No. 61, Met Eireann, Dublin',

Available for download at www.met.ie/climate/dataproducts/Estimation-of-Point-Rainfall-Frequencies_TN61.pdf

$$R = m5-60minutes / m5-2days$$

$$R = 17.8 / 65.8 = 0.27$$

Appendix C Causeway Flow Drainage Design Calculations

Design Settings

Frequency of use (kDU)	0.00	Minimum Velocity (m/s)	0.75
Flow per dwelling per day (l/day)	0	Connection Type	Level Soffits
Domestic Flow (l/s/ha)	0.0	Minimum Backdrop Height (m)	0.200
Industrial Flow (l/s/ha)	0.0	Preferred Cover Depth (m)	1.200
Additional Flow (%)	0	Include Intermediate Ground	✓

Nodes

Name	Cover Level (m)	Manhole Type	Easting (m)	Northing (m)	Depth (m)
F1-0	99.000	Adoptable	703587.064	728092.495	1.764
F1-1	98.600	Adoptable	703611.750	728132.213	1.832
FJ1	98.320		703619.826	728138.899	1.657
FJ2	99.100		703583.536	728087.111	1.800

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)
1.002	F1-1	FJ1	10.485	1.500	96.768	96.663	0.105	100.0	150
1.001	F1-0	F1-1	46.764	1.500	97.236	96.768	0.468	100.0	150
1.000	FJ2	F1-0	6.438	1.500	97.300	97.236	0.064	100.0	150


Name	Pro Vel @ 1/3 Q (m/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Dwellings (ha)	Σ Units (ha)	Σ Add Inflow (ha)	Pro Depth (mm)	Pro Velocity (m/s)
1.002	0.000	0.876	15.5	0.0	1.682	1.507	0.000	0	0.0	0.0	0	0.000
1.001	0.000	0.876	15.5	0.0	1.614	1.682	0.000	0	0.0	0.0	0	0.000
1.000	0.000	0.876	15.5	0.0	1.650	1.614	0.000	0	0.0	0.0	0	0.000

Pipeline Schedule




Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.002	10.485	100.0	150	Circular	98.600	96.768	1.682	98.320	96.663	1.507
1.001	46.764	100.0	150	Circular	99.000	97.236	1.614	98.600	96.768	1.682
1.000	6.438	100.0	150	Circular	99.100	97.300	1.650	99.000	97.236	1.614

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.002	F1-1	1200	Manhole	Adoptable	FJ1		Junction	
1.001	F1-0	1200	Manhole	Adoptable	F1-1	1200	Manhole	Adoptable
1.000	FJ2		Junction		F1-0	1200	Manhole	Adoptable

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	
F1-0	703587.064	728092.495	99.000	1.764	1200		1	1.000	97.236	150
							0	1.001	97.236	150

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	
F1-1	703611.750	728132.213	98.600	1.832	1200		1	1.001	96.768	150
							0	1.002	96.768	150
FJ1	703619.826	728138.899	98.320	1.657			1	1.002	96.663	150
FJ2	703583.536	728087.111	99.100	1.800			0	1.000	97.300	150

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	5	Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	0	Minimum Velocity (m/s)	1.00
FSR Region	Scotland and Ireland	Connection Type	Level Soffits
M5-60 (mm)	18.700	Minimum Backdrop Height (m)	0.200
Ratio-R	0.271	Preferred Cover Depth (m)	1.200
CV	0.750	Include Intermediate Ground	✓
Time of Entry (mins)	4.00	Enforce best practice design rules	✓

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
S1-0	0.045	4.00	99.000	1800	703577.047	728097.354	1.718
S2-0		4.00	98.660	1800	703596.634	728127.507	1.560
S1-1	0.038	4.00	98.700	1800	703589.900	728120.167	1.650
HEADWALL			98.000	1200	703581.508	728127.397	1.005
SJ1		4.00	99.100		703576.958	728093.750	1.800

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.002	S1-1	HEADWALL	11.077	0.600	97.050	96.995	0.055	200.0	300	4.39	50.0
1.001	S1-0	S1-1	26.185	0.600	97.282	97.151	0.131	200.0	900	4.22	50.0
2.000	S2-0	S1-1	9.961	0.600	97.100	97.050	0.050	200.0	900	4.08	50.0
1.000	SJ1	S1-0	3.605	0.600	97.300	97.282	0.018	200.0	900	4.03	50.0



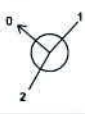


Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.002	1.108	78.3	11.2	1.350	0.705	0.082	0.0	76	0.790
1.001	2.212	1407.0	6.1	0.818	0.649	0.045	0.0	42	0.572
2.000	2.212	1407.0	0.0	0.660	0.750	0.000	0.0	0	0.000
1.000	2.212	1407.0	0.0	0.900	0.818	0.000	0.0	0	0.000

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.002	11.077	200.0	300	Circular	98.700	97.050	1.350	98.000	96.995	0.705
1.001	26.185	200.0	900	Circular	99.000	97.282	0.818	98.700	97.151	0.649
2.000	9.961	200.0	900	Circular	98.660	97.100	0.660	98.700	97.050	0.750
1.000	3.605	200.0	900	Circular	99.100	97.300	0.900	99.000	97.282	0.818

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.002	S1-1	1800	Manhole	Adoptable	HEADWALL	1200	Manhole	Adoptable
1.001	S1-0	1800	Manhole	Adoptable	S1-1	1800	Manhole	Adoptable
2.000	S2-0	1800	Manhole	Adoptable	S1-1	1800	Manhole	Adoptable
1.000	SJ1		Junction		S1-0	1800	Manhole	Adoptable

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
S1-0	703577.047	728097.354	99.000	1.718	1800	 0	1.000	97.282	900
						1	0	1.001	97.282
S2-0	703596.634	728127.507	98.660	1.560	1800	 0	2.000	97.100	900
S1-1	703589.900	728120.167	98.700	1.650	1800	 1	2.000	97.050	900
						2	1.001	97.151	900
						0	1.002	97.050	300
HEADWALL	703581.508	728127.397	98.000	1.005	1200	 1	1.002	96.995	300
S11	703576.958	728093.750	99.100	1.800		 0	1.000	97.300	900

Simulation Settings

Rainfall Methodology	FSR	Skip Steady State	x
FSR Region	Scotland and Ireland	Drain Down Time (mins)	240
M5-60 (mm)	18.700	Additional Storage (m³/ha)	20.0
Ratio-R	0.271	Check Discharge Rate(s)	✓
Summer CV	0.750	Check Discharge Volume	✓
Winter CV	0.840	100 year 360 minute (m³)	
Analysis Speed	Detailed		

Storm Durations

15	60	180	360	600	960	2160	4320	7200	10080
30	120	240	480	720	1440	2880	5760	8640	

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
100	20	0	0

Pre-development Discharge Rate

Site Makeup	Greenfield	Growth Factor 30 year	1.95
Greenfield Method	IH124	Growth Factor 100 year	2.48
Positively Drained Area (ha)		Betterment (%)	0
SAAR (mm)		QBar	
Soil Index	1	Q 1 year (l/s)	
SPR	0.10	Q 30 year (l/s)	
Region	1	Q 100 year (l/s)	
Growth Factor 1 year	0.85		

Pre-development Discharge Volume

Site Makeup	Greenfield	Return Period (years)	100
Greenfield Method	FSR/FEH	Climate Change (%)	0
Positively Drained Area (ha)		Storm Duration (mins)	360
Soil Index	1	Betterment (%)	0
SPR	0.10	PR	
CWI		Runoff Volume (m ³)	

Node HEADWALL Surcharged Outfall

Overrides Design Area	x	Depression Storage Area (m ²)	0	Evapo-transpiration (mm/day)	0
Overrides Design Additional Inflow	x	Depression Storage Depth (mm)	0		
Applies to All storms					

Time (mins)	Depth (m)	Time (mins)	Depth (m)
0	0.550	10080	0.550

Node S1-1 Online Hydro-Brake® Control

Flap Valve	✓	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	97.050	Product Number	CTL-SHE-0064-2000-1200-2000
Design Depth (m)	1.200	Min Outlet Diameter (m)	0.100
Design Flow (l/s)	2.0	Min Node Diameter (mm)	1200

Results for 100 year +20% CC Critical Storm Duration. Lowest mass balance: 98.69%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m ³)	Flood (m ³)	Status
480 minute winter	S1-0	352	98.273	0.991	2.8	3.0356	0.0000	SURCHARGED
480 minute winter	S2-0	344	98.273	1.173	0.6	2.9856	0.0000	SURCHARGED
480 minute winter	S1-1	352	98.273	1.223	4.0	3.6715	0.0000	SURCHARGED
15 minute summer	HEADWALL	1	97.545	0.550	0.9	0.0000	0.0000	OK
480 minute winter	SJ1	352	98.273	0.973	0.3	0.0000	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m ³)	Discharge Vol (m ³)
480 minute winter	S1-0	1.001	S1-1	1.8	0.380	0.001	16.5954	
480 minute winter	S2-0	2.000	S1-1	-0.6	-0.027	0.000	6.3130	
480 minute winter	S1-1	Hydro-Brake®	HEADWALL	1.8				44.6
480 minute winter	SJ1	1.000	S1-0	-0.3	-0.020	0.000	2.2848	

Appendix D Local Government Consultation

- a. Correspondence with Inland Fisheries Ireland**
- b. Irish Water Confirmation of Feasibility**

Mark Richardson
Punch Consulting
Carnegie House
Library Road
Dun Laoghaire
Co. Dublin
A96C7W7

Uisce Éireann
Bosca OP 448
Oifig Sheachadta
Cathrach Theas
Cathair Chorcaí

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

www.water.ie

17 May 2022

Re: CDS22002784 pre-connection enquiry - Subject to contract | Contract denied

Connection for Business Connection of 1 unit(s) at Junction to Clonlara Road, Dublin, Dublin

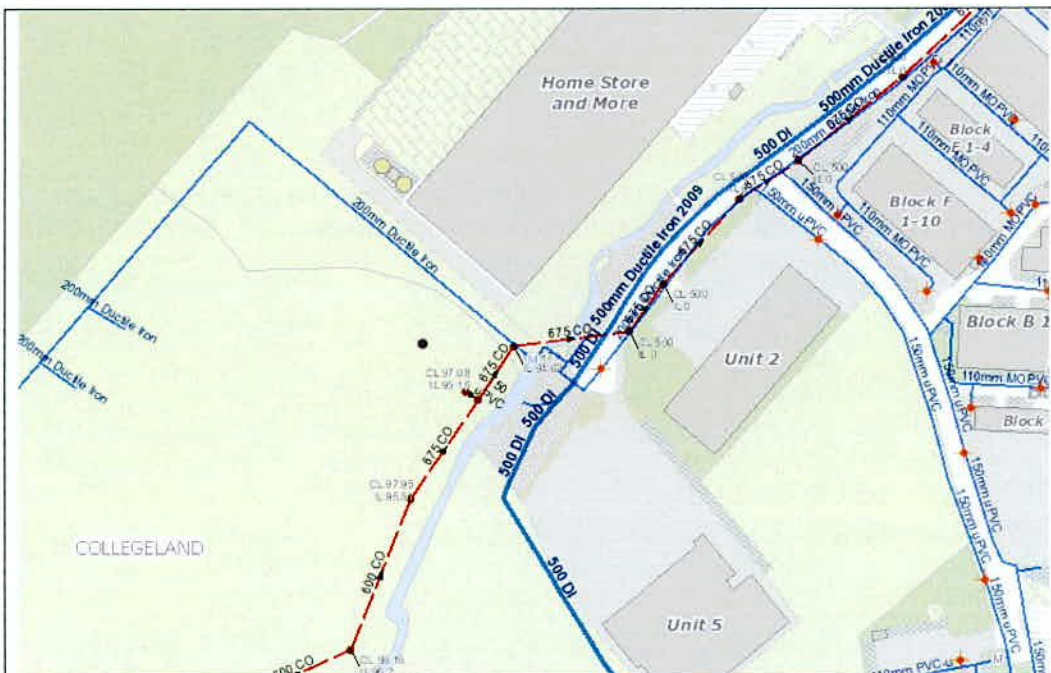
Dear Sir/Madam,

Irish Water has reviewed your pre-connection enquiry in relation to a Water & Wastewater connection at Junction to Clonlara Road, Dublin, 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 <u>THIS IS NOT A CONNECTION OFFER. YOU MUST APPLY FOR A CONNECTION(S) TO THE IRISH WATER NETWORK(S) IF YOU WISH TO PROCEED.</u>
Water Connection	Feasible without infrastructure upgrade by Irish Water
Wastewater Connection	Feasible without infrastructure upgrade by Irish Water
SITE SPECIFIC COMMENTS	
Water Connection	<p>A 200mm diameter watermain section is feasible to be laid in the roadway. All works are to be carried out in accordance with the Irish Water Codes of Practice and Standard Details.</p> <p>No connection to the Irish Water network will be carried out until a connection application is made to Irish Water including flow demands as per the Irish Water Codes of Practice.</p> <p>This section of watermain will be subject to inspection from Irish Water at connection application stage. The applicant will be responsible for funding the rectification of any defects identified during these inspection works.</p>

	<p>Diversion of the infrastructure may be required subject to layout proposal of the development and separation distances. For design submissions and queries related to diversion/build near or over, please contact IW Diversion Team via email address diversions@water.ie . For further information related to diversion please visit www.water.ie/connections/developer-services/diversions.</p>
<p>Wastewater Connection</p>	<p>A 225mm diameter wastewater sewer section is feasible to be laid in the roadway.</p> <p>All works are to be carried out in accordance with the Irish Water Codes of Practice and Standard Details.</p> <p>No connection to the Irish Water network will be carried out until a connection application is made to Irish Water including flow demands as per the Irish Water Codes of Practice.</p> <p>This section of wastewater sewer will be subject to inspection from Irish Water at connection application stage. The applicant will be responsible for funding the rectification of any defects identified during these inspection works.</p>
<p>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.</p>	

The map included below outlines the current Irish Water infrastructure adjacent to your site:



Reproduced from the Ordnance Survey of Ireland by Permission of the Government. License No. 3-3-34

Whilst every care has been taken in its compilation Irish Water gives this information as to the position of its underground network as a general guide only on the strict understanding that it is based on the best available

information provided by each Local Authority in Ireland to Irish Water. Irish Water can assume no responsibility for and give no guarantees, undertakings or warranties concerning the accuracy, completeness or up to date nature of the information provided and does not accept any liability whatsoever arising from any errors or omissions. This information should not be relied upon in the event of excavations or any other works being carried out in the vicinity of the Irish Water underground network. The onus is on the parties carrying out excavations or any other works to ensure the exact location of the Irish Water underground network is identified prior to excavations or any other works being carried out. Service connection pipes are not generally shown but their presence should be anticipated.

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 Kevin McManmon from the design team at kmcmanmon@water.ie For further information, visit www.water.ie/connections.

Yours sincerely,



Yvonne Harris

Head of Customer Operations

Mark Richardson | PUNCH

From: Roisin O'Callaghan <Roisin.O'Callaghan@fisheriesireland.ie>
Sent: Wednesday 25 May 2022 16:44
To: Mark Richardson | PUNCH
Cc: Matthew Carroll
Subject: RE: 212126 Access Rd , Clonlara Rd Baldonnell - Headwall discharge to River Camac

Hi Mark

The headwalls drawing plans seem acceptable to IFI in principle. We will comment fully at the planning stage.

Kind Regards,

Roisin

From: Mark Richardson | PUNCH <mrichardson@punchconsulting.com>
Sent: Tuesday 24 May 2022 14:59
To: Gretta Hannigan <Gretta.Hannigan@fisheriesireland.ie>; Roisin O'Callaghan <Roisin.O'Callaghan@fisheriesireland.ie>
Cc: Leonard Brennan | PUNCH <lbrennan@punchconsulting.com>; Garrett Robinson <grobison@oversite.ie>
Subject: RE: 212126 Access Rd , Clonlara Rd Baldonnell - Headwall discharge to River Camac

*****CYBER SECURITY WARNING***:** This email originated from outside of Inland Fisheries Ireland email system and contains an attachment(s). Do not open attachments from unknown sources.

Hi Gretta / Roisin,

I hope you are well.

I wonder did you have a chance to review the drawing provided, and whether you have any comments in advance of our planning application.

Please refer attached slightly updated drawing for ease of reference.

Thanks

	Mark Richardson BA BAI(Hons) CEng Senior Engineer
--	--

Carnegie House, Library Road, Dun Laoghaire, Co Dublin, A96 C7W7, Ireland
t+353 1 271 2200 m+353 87 190 1262 | e mrichardson@punchconsulting.com
Dublin | Limerick | Cork | Galway | Glasgow

From: Mark Richardson | PUNCH
Sent: Tuesday 10 May 2022 12:46
To: Gretta Hannigan <Gretta.Hannigan@fisheriesireland.ie>
Cc: Roisin O'Callaghan <Roisin.O'Callaghan@fisheriesireland.ie>; Leonard Brennan | PUNCH

<lbrennan@punchconsulting.com>; Garrett Robinson <grobinson@oversite.ie>

Subject: 212126 Access Rd , Clonlara Rd Baldonnell - Headwall discharge to River Camac [Filed 10 May 2022 12:46]

Good Afternoon Gretta,

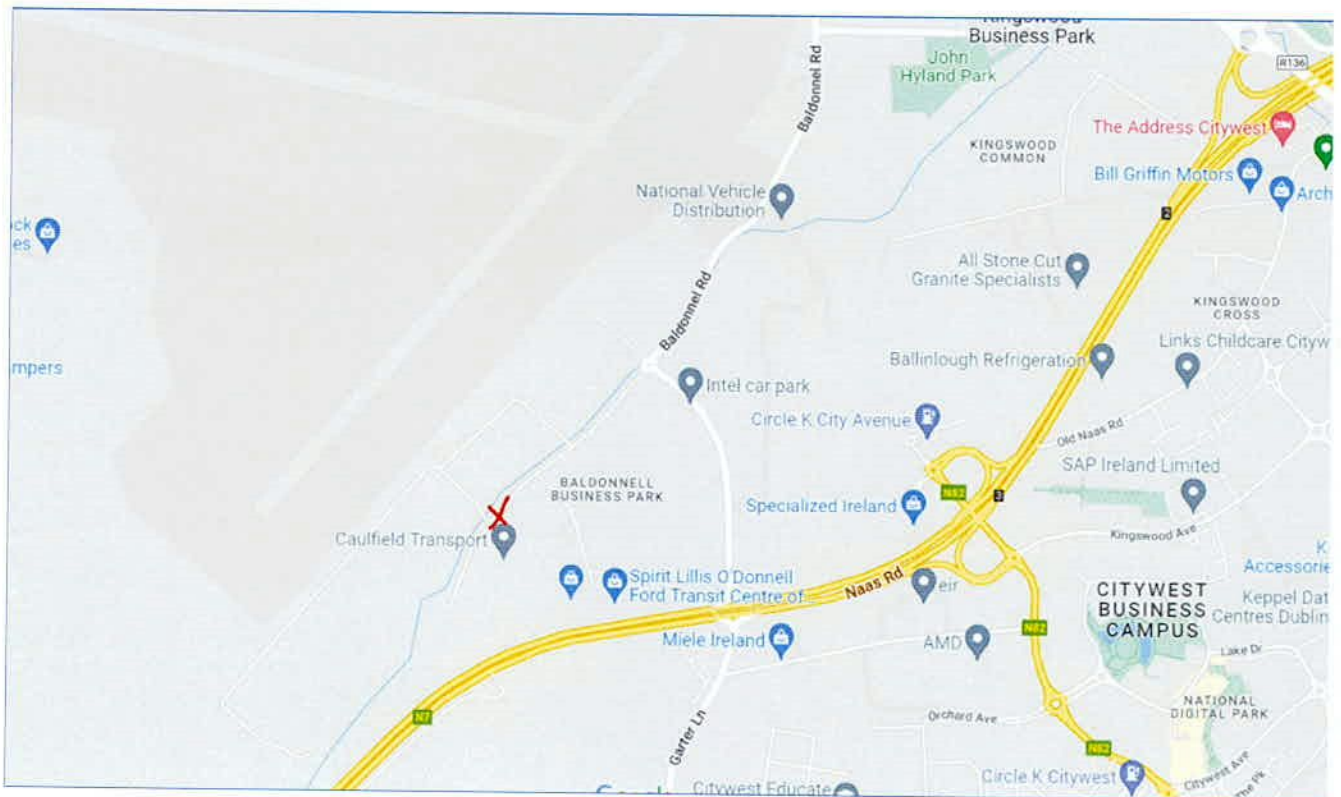
I trust you are well.

Please note that there is a planning application intended for a new access road at the above location.

As part of the development drainage, a new headwall discharge is proposed to the River Camac. Surface water attenuation is proposed for the road in oversized pipes indicated. Please see attached drainage drawing and scaled out drawing showing location. The final location of the headwall may be slightly different than that located on this drawing in the final planning application, however the general location will remain.

Please can you provide IFI comment on the proposed headwall discharge location. We would very much like to have IFI endorsement of the development for the planning application. If you wish, please feel free to call and discuss.

The overall location of the site is at the red 'x' indicated below, between N7 and Casement Aerodrome.



Thank you very much,

	Mark Richardson BA BAI(Hons) CEng Senior Engineer
---	--

Carnegie House, Library Road, Dun Laoghaire, Co Dublin, A96 C7W7, Ireland
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Dublin | Limerick | Cork | Galway | Glasgow

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