2 Clogheen Business Park,
Blarney Road, Cork,
Ireland.

T: +353 (0)21 4399799
F: +353 (0)21 4399797
E: admin@rka.ie
W: www.rka.ie

CONSULTING ENGINEERS
CIVIL | STRUCTURAL | PROJECT MANAGEMENT

Services Report

Project Number: 0567002

Proposed Development
At Kinsale Road, Cork City.

Client :Cetti Limited

Design by: PF & ME

Date: June 2022

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1.0 Proposed Surface Water Design & Discharge

Note that the site is an infill site. There is historically a factory/warehouse at this location. These are proposed to be demolished as part of the proposed development.

The new site proposal includes 39 No. apartments.

It is proposed to connect the surface water to the existing public sewer located on Kinsale Road. An Attenuation System will be provided ,subject to agreement with Cork City Council, prior to connection to the public sewer.

All proposed drainage works are designed to comply with and be carried out in accordance with the current edition of the Recommendations for Site Development Works for Housing Areas published by the Department of Environment and Local Government.

Drainage works also shall comply with Irish Water/Local Authority requirements.

Sewers carrying domestic surface water from this proposed development shall have a sewer minimum sewer size of 225mm and the gradients are to achieve self cleansing velocities.

It is proposed to provide attenuation for the building and the courtyard of the development. There are site constraints which are limiting the options for the design of the attenuation system.

As a consequence of the shallow depth of the receiving sewer, it is proposed to use a Geocellular Crate System with sufficient cover to provide for the structural integrity of the crates as an attenuation system.

For the reasons outlined above, it has been decided that the attenuation will be provided by a Roadstone AquaCell Range Attenuation System or similar approved. The AquaCellange of Geocellular Systems are a fully tried and tested, BBA approved, modular technique for managing excessive rainfall. AquaCell units have dimensions of (1m x 0.5m x 0.4m).

A flow control device at the exit will control the discharge from the site to a flow of 4 l/sec.

Please refer to RKA Proposed Drainage Layout Dwg. 1002-P which indicates the proposed point of connection to the public sewer on Kinsale Road.

Design of the Attenuation System

The flow rate from the proposed development shall have Qbar rate of **4l/sec.**

The attenuation shall be designed to provide for a **1 in 50 year storm**

The storage volume required for the attenuation is as follows;

Storage capacity required is given by the Billam Formula

$$S = \frac{640\,(Ap)^{1.4} - 2.54A}{((N)\,(P))^{0.4}}$$

Where S = Critical storage volume (m3)
Ap = Impermeable Area (Ha)
N = No. of storms in a 10 year period
P = Permitted outflow (l/sec)

S = Critical storage volume (m3)
Ap = 0.15 Ha
N = 0.20(1 in 50 yr. Storm event)
P = 4 l/sec

$$S = \frac{640\,(0.15)^{1.4} - (25.4)(0.15)}{((0.20)\,(4))^{0.4}}$$

$= 45\ m^3$

Proposed Attenuation Tank Volume

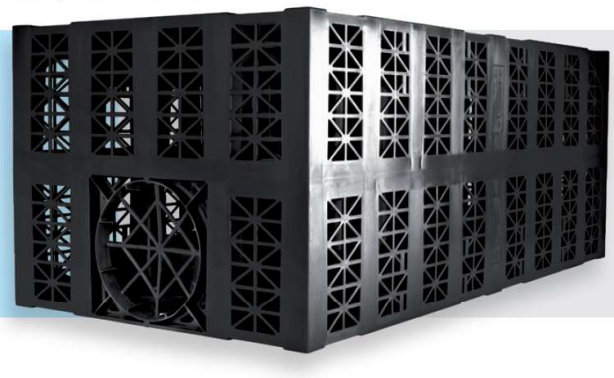
The AquaCell System will have an available depth of 0.8m. The void ratio in the stone is 95%. Accordingly, the area required for the Aquacell System is given by; 12x5x0.8 = 48 m3.

Product Datasheet

AquaCell Core-R

Product description

AquaCell Core-R has been designed for use in deep applications, subject to regular and heavy traffic loadings, e.g. cars and HGV's. AquaCell Core-R can also be used in both landscaped and deep soakaway applications.



Technical specification

Product code / SAP code	6LB150 / 4064830	**Void ratio**	95%
Colour	Black	**Material**	Recycled PP
Dimensions	1m x 0.5m x 0.4m	**Vertical loading**	66.9 tonnes/m² (669 kN/m²)
Weight	11.5kg	**Lateral loading**	12.3 tonnes/m² (123 kN/m²)
Storage volume	190 litres	**BBA approval**	Certificate 03/4018

Maximum installation depths

Typical soil type	Maximum depth of installation – to base of units (m)[1]				
	Soil weight kN/m³	Angle of internal friction φ (degrees)[2, 3]	Landscaped areas	Vehicle mass <9 tonnes[4, 5]	Vehicle mass <44 tonnes
Over consolidated stiff clay	20	24	3.85	3.61	3.36
Silty sandy clay	19	26	4.35	4.09	3.83
Loose sand and gravel	18	30	5.34	5.06	4.78
Medium dense sand and gravel	19	34	5.94	5.68	5.41
Dense sand and gravel	20	38	6.68	6.43	6.18

Minimum cover depths

	Landscaped areas	Car parks with vehicle mass <3 tonnes[5]	Car parks with vehicle mass <9 tonnes	Car parks with vehicle mass <12 tonnes	Low speed roads with vehicle mass <60 tonnes
Minimum cover depth (m)	0.30	0.50	0.60	0.70	1.11

1. Without groundwater present below base of units – AquaCell Core-R may be used where groundwater is present, contact Wavin for technical advice.
2. Loosening of dense sand or softening of clay by water can occur during installation. The designer should allow for any such likely effects when choosing an appropriate value of φ.
3. The design is very sensitive to small changes in the assumed value of φ, therefore, it should be confirmed by a chartered geotechnical engineer. In clay soils, it may be possible to utilise cohesion in some cases.
4. Applicable for car parks or other areas trafficked only by cars or occasional refuse collection trucks or similar vehicles (typically one per week).
5. This category should be used when considering landscaped areas that may be trafficked by ride on mowers.

Assumptions made:

- Ground surface is horizontal
- Shear planes or other weaknesses are not present within the structure of the soil

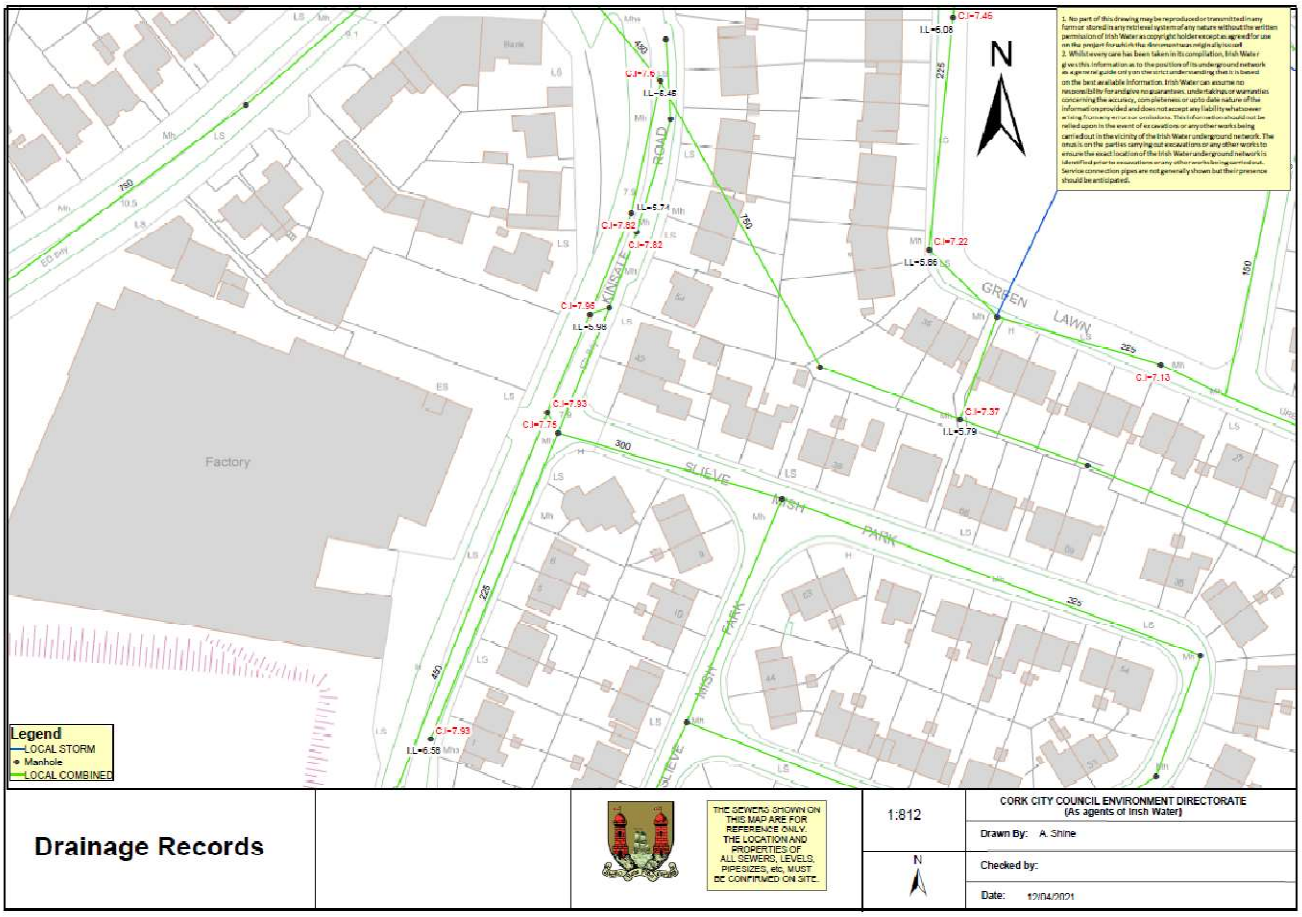
Source: BBA

Wavin Ireland Ltd | Balbriggan | Co Dublin | K32 K840
Tel 01 8020200 | **Email** info.ie@wavin.com | **Website** www.wavin.ie

June 2021

2.0 Proposed Foul Water Design and Discharge

39 No. Units in this development are proposed to connect to the existing Public Sewer located in the road on Kinsale Road subject to Irish Water approval and agreement.



Existing Drainage Records

Please refer to RKA Proposed Drainage Layout Dwg. 1002-P.

Sewers carrying domestic wastewater from this proposed housing developments should be designed to carry a minimum wastewater volume of six times dry weather flows (6DWF).

Dry Weather Flow (DWF) is taken as 600 litres per dwelling (three persons per house and a per capita wastewater flow of 200 litres per head per day).

Total Dry Weather Flow (DWF) = 39 x 600 /24/60/60 = 0.270 l/s

Peak Flow taken as 5dwf = 5 x 0.270 = 1.35 l/s

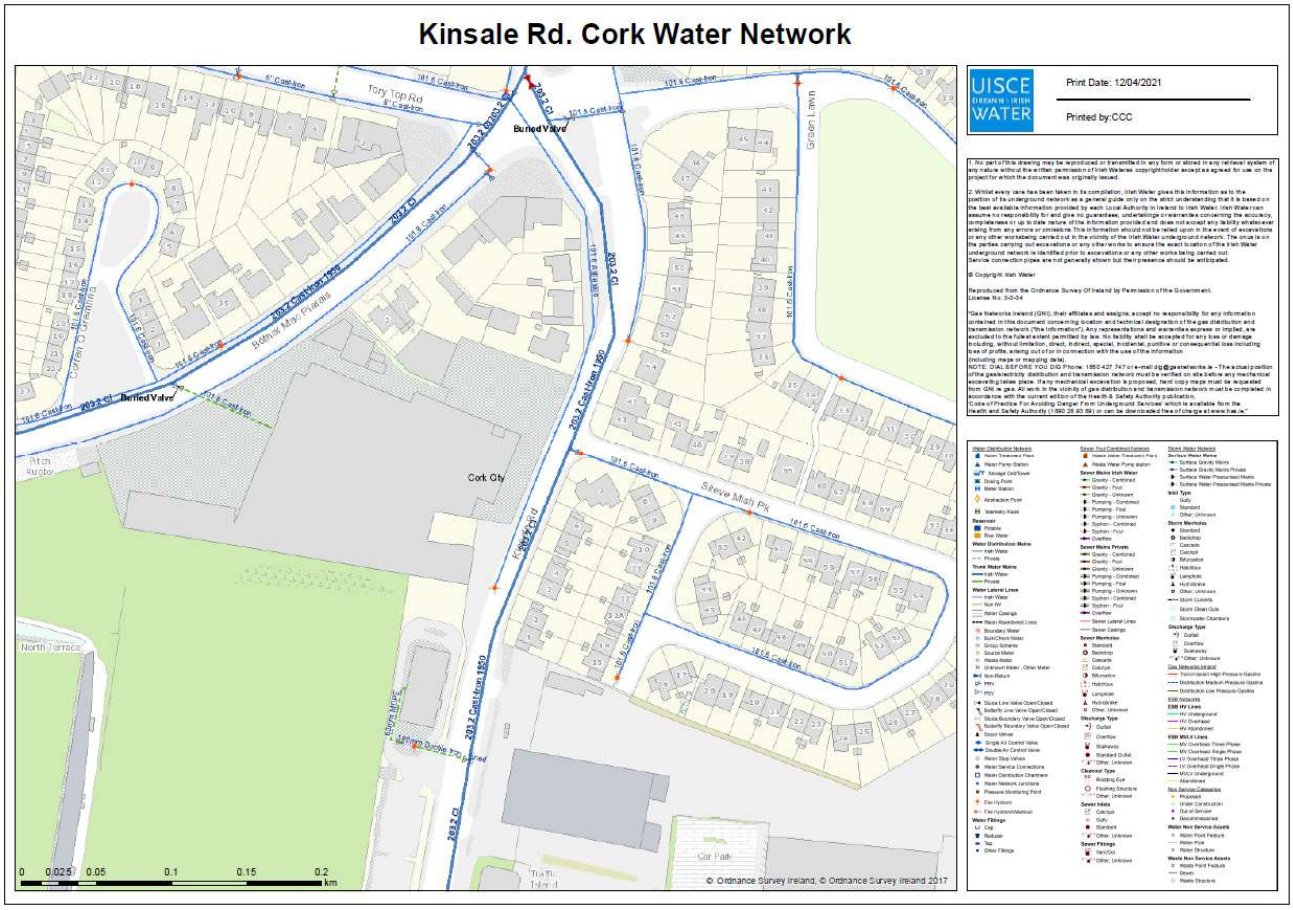
Foul Pipe Network is designed to carry a minimum wastewater volume of six times Dry Weather Flows (6DWF).

6 DWF = 6 x 0.270 = 1.62 l/s

Please refer to Irish Water's Code of Practice for Wastewater Infrastructure document (IW-CDS-5030-03) for wastewater requirements.

3.0 Proposed Water and Firefighting Supply

39 No. units in this development are proposed to connect to the existing Public Watermain located in the road on Kinsale Road subject to Irish water approval and agreement.



Existing Watermain Records

Please refer to RKA Proposed Watermain Layout Dwg.1003-P which indicates the proposed point of connection to the public watermain on Kinsale Road.

Water Demand

The water demand includes: Average domestic daily demand in the development is established based on daily per-capita consumption, house occupancy, number of properties.

For design purposes the average daily domestic demand is be based on a per-capita consumption of 150 l/person/day and an average occupancy ratio of 2.7 persons per dwelling.

39 properties : 39x150x2.7= 15,795 l/day

Total Average Daily Demand = 15,795 l/day

Average Daily Demand per hour = 15,795/24 = 658 litres/hour

The average day/peak week demand should be taken a 1.25 times the Average Daily Domestic Demand.

Total average day/peak demand = 15,795 x 1.25 = 19,743 l/day (peak demand)

Post-development peak hour water demand = 19,743/24 = 822 litres/hour

The peak demand for sizing of the pipe network will normally be 5 times the average day, peak week demand.

Peak Demand = 19,743 x 5= 4,113 litres/hour

Fire Fighting Requirements

Pressure and flow to be determined on site to meet the requirements of Irish Water/Cork City Council Water and Fire Department.

The flows (l/s) and pressure (dynamic – bar) from the existing/adjacent/extended fire water main hydrants, will be tested and if required, storage and a variable speed booster pump will be installed.

4.0 Irish Water Confirmation of Feasibility Letter

UISCE ÉIREANN \| IRISH WATER

Dan Twohig
RKA Engineers
2 Clogheen Business Park
Blarney Road
Co. Cork
T23X70V

UisceÉireann
Bosca OP 448
Oifig Sheachadta na
Cathrach Theas
Cathair Chorcaí

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

www.water.ie

7 January 2022

Re: CDS21008922 pre-connection enquiry - Subject to contract | Contract denied

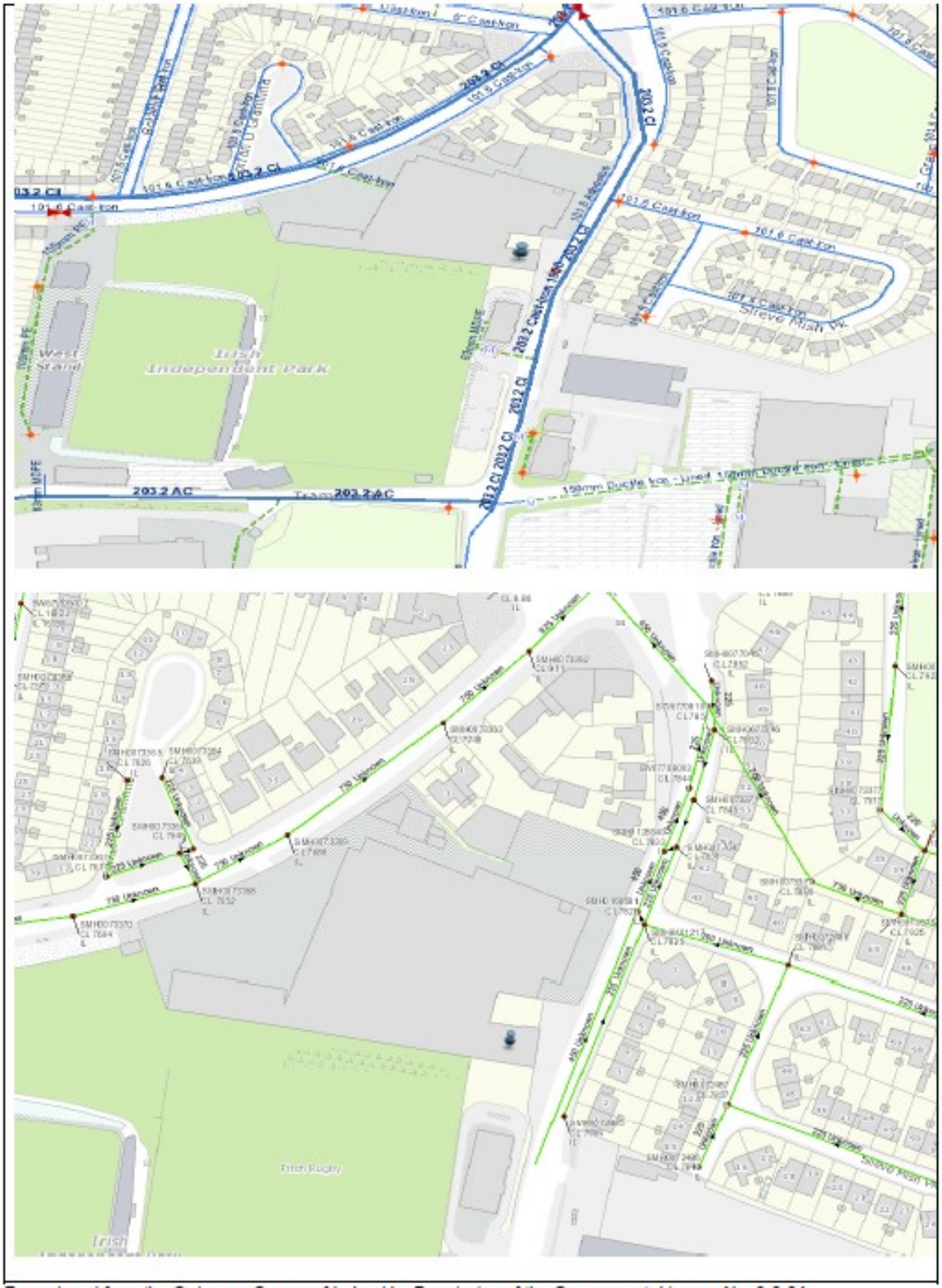
Connection for Housing Development of 47 unit(s) at Site at Kinsale Road, Cork City, Cork

Dear Sir/Madam,

Irish Water has reviewed your pre-connection enquiry in relation to a Water & Wastewater connection at Site at Kinsale Road, Cork City, Cork (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	
Water Connection	
Wastewater Connection	Foul to connect to 225mm sewer. Attenuated storm to connect to parallel storm system or 450mm sewer
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.	

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 Brian Lavelle from the design team on or email brian.lavelle@water.ie For further information, visit **www.water.ie/connections.**

Yours sincerely,

Yvonne Harris

Yvonne Harris

Head of Customer Operations

5.0 Proposed Site Layout

6.0 Historical Aerial View of Site

7.0 Proposed Drainage Layout

Please refer to RKA Proposed Drainage Layout Dwg.1002-P.

8.0 Proposed Watermain Layout

Please refer to RKA Proposed Watermain Layout Dwg. 1003-P.