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CONSULTING ENGINEERS
CIVIL | STRUCTURAL | PROJECT MANAGEMENT

SERVICES REPORT

Including :
Proposed Surface Water Discharge
Proposed Foul Water Discharge
Proposed Water Supply
Preliminary Flood Study

Project Reference: Proposed Housing Project
At Mill Rd., Kanturk

Client: Cork County Council

Project No.: 570000

Design By: B.A. & G.R.

Date: Jun '23
Rev: 1

ISO 9001
REGISTERED FIRM

List of Contents

Introduction

The subject lands of the application are located to the south of Kanturk village, on Mill Road. The site has one vacant disused bungalow which is proposed to be demolished.

The eastern boundary of the site is on to Mill Road. There are water, storm sewer and telecom services in the roadway. There is an overhead ESB line through the site which is proposed to be diverted underground.

A utilities survey was carried out on the site by Priority Geotechnical. The survey identified a 350mm diameter surface water sewer in the roadway. Priority Geotechnical also carried out BRE testing on the site to investigate the feasibility of a soakway on the site. The results of the testing were inconclusive- one test provided adequate percolation, the other test did not provide adequate percolation. While it is anticipated to be sufficient percolation to ground if the soakway reaches the shale layer on the site, as a precaution it is recommended to provide an attenuated overflow from the site to the storm sewer in the road.

Three options were considered for connecting to the foul sewer. Following initial investigations, the preferred option was to connect to the foul sewer in Dr. O'Callaghan Park to the southeast of the site. However, after further investigations it is now proposed to connect to a buried manhole in the road approximately 120m south of the site. This will need to be confirmed with Irish Water. A pre-connection enquiry has been completed and a full connection application will be carried out once the site has planning.

It is proposed to connect to the existing watermain in Mill Road, the public road on the eastern side of the site.

SUDS Assessment

The site has been assessed for suitability for applying for SuDS (Sustainable Drainage Systems) measures for the development. The principal outcome of the study found that infiltration measures are suitable for the site, however, due to the variability of infiltration on the site and attenuated overflow to the storm sewer is recommended.

SuDS measures have been considered as per the table below: -

Measure Considered	Assessment	Adopt
Rainwater Harvesting	Rainwater butts to be installed in the downpipes of the houses	Y
Green Roof	Due to the nature of the site a green roof would not be practical	N
Infiltration Systems	Soakaway proposed into the shale layer at approximately 2m depth	Y
Proprietary Treatment Systems	Not suitable due to Site type and scale	N
Filter Strips	Not suitable due to Site type and scale	N
Filter Drains	Not suitable due to Site type and scale	N
Swales	Not suitable due to Site type and scale	N
Bio-Retention Systems	Not suitable due to Industrial Site type and scale	N
Trees	Not extensive due to Site type and scale, some planting will be done on site	Y
Attenuation Storage Tanks	As the infiltration measures are variable it is proposed to provide an overflow connected to the soakaway with attenuation volume to control the flow from the development in extreme rain events where an overflow may be required	Y
Detention Basin	Not suitable due to site type and scale	N
Ponds & Wetlands	Not suitable due to site type and scale	N
Pervious Pavements	Not suitable due to scale of the site and the maintenance required	N

The surface water on the site will discharge to a soakaway via an oil interceptor. There will be an overflow pipe from the soakaway connected to the storm drain in the public road. The soakaway will have a storage volume above the overflow pipe for the required attenuation volume. The overflow from the soakaway will have a hydrobreak valve attenuating the flow in the unlikely event of the overflow being required.

Surface water runoff

Exercise in looking at surface water drainage "effective area" runoff for the site.

Areas to be included in the "effective area" are surface areas of roofs, paths, roads, parking bays, lawns, gardens & green surfaces.

An impermeability factor of 1.0 is used for roofs, 0.9 is used for footpaths and hard standing areas, a factor of 0.2 is used for green areas and back gardens.

630sqm of roofs x 1.0= 630sqm
1100sqm of footpaths and roads x 0.9= 990sqm
2420sqm of green area contributing x 0.2= 484sqm

Overall Effective Runoff = Total Impermeable area = Ap = **2,104 m2**

Proposed to use Infiltration Pluvial Cube system which consists of modular polypropylene units, low flow maintenance and self-cleaning channels.

Note prior to discharge to the soakaway, the rainwater runoff from the proposed overall development is proposed to go through a hydrocarbon interceptor & silt trap.

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

The soakaway design in accordance with BRE365 is as follows: -

Infiltration testing in accordance with BRE365 was carried out by Priority Geotechnical Ltd. The results of the testing were variable. It is recommended to install a soakaway to approximately 2m depth into the top of the shale rock under the site. The proposed soakaway is designed for a 10yr storm. The required depth of the soakaway is 909mm, **therefore a 900mm deep system** is selected with an overflow and further depth in the tank to allow for extreme events and climate change- giving an overall depth of the soakaway of 1200mm.

The soil infiltration rate is taken from the site testing in accordance with BRE365 undertaken by Priority Geotechnical is calculated in the following soakaway design. Two infiltration tests were carried out on the site in accordance with BRE365. One of the tests did not have satisfactory infiltration. The second test achieved an acceptable level of infiltration to do an underground

soakaway. It is recommended to install the soakaway to approximately 2m depth into the top of the shale layer. Given the variability of results on the site it is recommended to have an attenuated overflow from the underground tank connected to the storm sewer in the public road.

SOAKAWAY DESIGN

In accordance with BRE Digest 365 - Soakaway design

Tedds calculation version 2.0.04

Design rainfall intensity

Location of catchment area;	Other
Impermeable area drained to the system;	A = **2104.0** m^2
Return period;	Period = **10** yr
Ratio 60 min to 2 day rainfall of 5 yr return period;	r = **0.360**
5-year return period rainfall of 60 minutes duration;	M5_60min = **17.7** mm
Increase of rainfall intensity due to global warming;	$p_{climate}$ = **0** %

Soakaway / infiltration trench details

Soakaway type;	Rectangular
Minimum depth of pit (below incoming invert);	d = **909** mm
Width of pit;	w = **18000** mm
Length of pit;	l = **6000** mm
Percentage free volume;	V_{free} = **95** %

Soil infiltration rate (BRE digest 365)

Length of trial pit;	l_{trial} = **2500** mm
Width of trial pit;	b_{trial} = **1000** mm
Depth of trial pit (below invert);	d_{trial} = **200** mm
Free volume (if fill used);	V_{trial} = **100** %;
75% depth of pit;	d_{75} = (d_{trial} × 0.75) = **150.00** mm
50% depth of pit;	d_{50} = (d_{trial} × 0.50) = **100.00** mm
25% depth of pit;	d_{25} = (d_{trial} × 0.25) = **50.00** mm
Test 1 - time to fall from 75% depth to 25% depth;	T1 = **70** min
Test 2 - time to fall from 75% depth to 25% depth;	T2 = **65** min
Test 3 - time to fall from 75% depth to 25% depth;	T3 = **65** min
Longest time to fall from 75% depth to 25% depth;	t_{lg} = max(T1, T2, T3) = **70** min
Storage volume from 75% to 25% depth;	V_{p75_25} = (l_{trial} × b_{trial} × (d_{75} - d_{25})) × V_{trial} = **0.25** m^3
Internal surface area to 50% depth;	a_{p50} = ((l_{trial} × b_{trial}) + (l_{trial} + b_{trial}) × 2 × d_{50}) = **3.20** m^2
Surface area of soakaway to 50% storage depth;	A_{s50} = 2 × (l_{trial} + b_{trial}) × d_{trial} / 2 = **0.700** m^2
Soil infiltration rate;	f = V_{p75_25} / (a_{p50} × t_{lg}) = **18.6×10^{-6}** m/s
Wetted area of pit 50% full;	a_{s50} = l × d + w × d = **21824444** mm^2

Table equations

Inflow (cl.3.3.1);	I = M10 × A
Outflow (cl.3.3.2);	O = a_{s50} × f × D
Storage (cl.3.3.3);	S = I - O

Duration, D (min)	Growth factor Z1	M5 rainfalls (mm)	Growth factor Z2	10-year rainfall, M10 (mm)	Inflow (m^3)	Outflow (m^3)	Storage required (m^3)
5;	0.36;	6.4;	1.18;	7.5;	15.76;	0.12;	15.64
10;	0.51;	9.0;	1.19;	10.7;	22.53;	0.24;	22.28
15;	0.62;	11.0;	1.19;	13.1;	27.52;	0.37;	27.16
30;	0.79;	14.0;	1.20;	16.8;	35.24;	0.73;	34.51
60;	1.00;	17.7;	1.19;	21.1;	44.49;	1.46;	43.03
120;	1.22;	21.6;	1.19;	25.6;	53.92;	2.92;	51.00
240;	1.48;	26.2;	1.18;	30.9;	65.04;	5.85;	59.19
360;	1.67;	29.6;	1.18;	34.9;	73.39;	8.77;	64.62
600;	1.90;	33.6;	1.18;	39.6;	83.24;	14.61;	68.62
1440;	2.42;	42.8;	1.17;	50.0;	105.19;	35.08;	70.11

Required storage volume; S_{req} = **70.11** m^3

Soakaway storage volume; $S_{act} = l \times d \times w \times V_{free}$ = **93.30** m^3

PASS - Soakaway storage volume

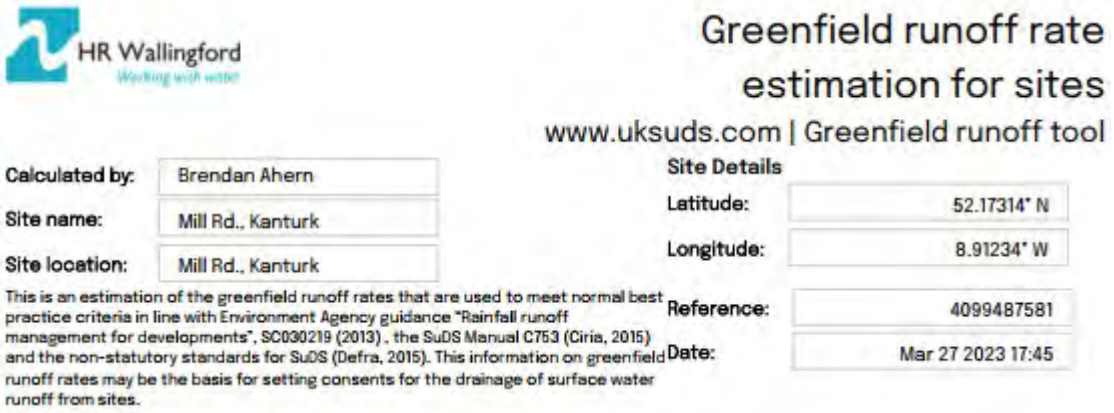
Time for emptying soakaway to half volume; $t_{s50} = S_{req} \times 0.5 / (a_{s50} \times f)$; = 23hr 59min 11s

PASS - Soakaway discharge time less than or equal to 24 hours

Design of attenuation system

Greenfield run-off estimation: -

The area of the site is 4150sqm. The design run-off for a 30 yr storm is 5.46l/sec- this is shown in the following HR Wallingford Greenfield run-off estimation tool. The overflow from the attenuation will be fitted with a hydrobreak design for a flow rate of 5l/sec.



HR Wallingford

Greenfield runoff rate estimation for sites

www.uksuds.com | Greenfield runoff tool

Calculated by:	Brendan Ahern
Site name:	Mill Rd., Kanturk
Site location:	Mill Rd., Kanturk

This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance "Rainfall runoff management for developments", SC030219 (2013), the SuDS Manual C753 (Ciria, 2015) and the non-statutory standards for SuDS (Defra, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Site Details

Latitude:	52.17314° N
Longitude:	8.91234° W
Reference:	4099487581
Date:	Mar 27 2023 17:45

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Project				Job Ref.	
Proposed Housing at Mill Road, Kanturk				0570000	
Section				Sheet no./rev	
Surface Water Disposal					
Calc. By	Date	Chck'd by	Date	App'd by	Date
G.R.	Mar '23	BA	Mar '23		

Runoff estimation approach IH124

Site characteristics

Total site area (ha): .4150

Methodology

Q_{BAR} estimation method: Calculate from SPR and SAAR

SPR estimation method: Calculate from SOIL type

Soil characteristics	Default	Edited
SOIL type:	4	4
HOST class:	N/A	N/A
SPR/SPRHOST:	0.47	0.47

Hydrological characteristics	Default	Edited
SAAR (mm):	1074	1074
Hydrological region:	13	13
Growth curve factor 1 year:	0.85	0.85
Growth curve factor 30 years:	1.65	1.65
Growth curve factor 100 years:	1.95	1.95
Growth curve factor 200 years:	2.15	2.15

Notes

(1) Is Q_{BAR} < 2.0 l/s/ha?

When Q_{BAR} is < 2.0 l/s/ha then limiting discharge rates are set at 2.0 l/s/ha.

(2) Are flow rates < 5.0 l/s?

Where flow rates are less than 5.0 l/s consent for discharge is usually set at 5.0 l/s if blockage from vegetation and other materials is possible. Lower consent flow rates may be set where the blockage risk is addressed by using appropriate drainage elements.

(3) Is SPR/SPRHOST ≤ 0.3?

Where groundwater levels are low enough the use of soakaways to avoid discharge offsite would normally be preferred for disposal of surface water runoff.

Greenfield runoff rates	Default	Edited
Q_{BAR} (l/s):	3.31	3.31
1 in 1 year (l/s):	2.81	2.81
1 in 30 years (l/s):	5.46	5.46
1 in 100 year (l/s):	6.45	6.45
1 in 200 years (l/s):	7.11	7.11

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G.R.	Mar '23	BA	Mar '23		

The rainfall records for the site are obtained from Met Eireann as follows: -

Met Eireann
Return Period Rainfall Depths for sliding Durations
Irish Grid: Easting: 137588, Northing: 102685,

	Interval		Years								
DURATION	6months,	1year,	2,	3,	4,	5,	10,	20,	30,	50,	75,	100,
5 mins	2.9,	4.1,	4.7,	5.5,	6.1,	6.6,	8.1,	9.7,	10.8,	12.3,	13.6,	14.7,
10 mins	4.1,	5.7,	6.5,	7.7,	8.5,	9.2,	11.2,	13.5,	15.0,	17.2,	19.0,	20.4,
15 mins	4.8,	6.7,	7.6,	9.1,	10.0,	10.8,	13.2,	15.9,	17.7,	20.2,	22.4,	24.1,
30 mins	6.4,	8.7,	9.9,	11.7,	12.9,	13.8,	16.8,	20.0,	22.2,	25.1,	27.7,	29.7,
1 hours	8.4,	11.3,	12.8,	15.0,	16.5,	17.6,	21.2,	25.2,	27.8,	31.3,	34.4,	36.8,
2 hours	11.2,	14.8,	16.7,	19.4,	21.2,	22.5,	26.9,	31.7,	34.8,	39.0,	42.7,	45.5,
3 hours	13.1,	17.3,	19.4,	22.5,	24.5,	26.0,	30.9,	36.2,	39.6,	44.3,	48.4,	51.5,
4 hours	14.7,	19.3,	21.6,	24.9,	27.1,	28.8,	34.1,	39.9,	43.5,	48.5,	52.9,	56.2,
6 hours	17.4,	22.5,	25.1,	28.9,	31.4,	33.3,	39.2,	45.6,	49.6,	55.2,	60.0,	63.6,
9 hours	20.4,	26.3,	29.3,	33.5,	36.3,	38.4,	45.0,	52.1,	56.6,	62.8,	68.0,	72.0,
12 hours	22.9,	29.4,	32.6,	37.2,	40.2,	42.5,	49.7,	57.3,	62.2,	68.7,	74.4,	78.7,
18 hours	27.0,	34.3,	38.0,	43.2,	46.5,	49.1,	57.1,	65.6,	70.9,	78.2,	84.4,	89.0,
24 hours	30.3,	38.3,	42.3,	47.9,	51.6,	54.4,	63.0,	72.1,	77.8,	85.6,	92.2,	97.2,
2 days	39.3,	48.3,	52.7,	58.9,	62.8,	65.8,	74.9,	84.5,	90.4,	98.4,	105.1,	110.1,
3 days	47.0,	56.9,	61.7,	68.4,	72.6,	75.8,	85.4,	95.4,	101.6,	109.8,	116.8,	121.9,
4 days	54.1,	64.8,	69.9,	77.0,	81.5,	84.8,	95.0,	105.4,	111.9,	120.4,	127.5,	132.8,
6 days	67.3,	79.3,	84.9,	92.8,	97.7,	101.3,	112.4,	123.6,	130.4,	139.5,	147.0,	152.5,
8 days	79.5,	92.6,	98.8,	107.3,	112.6,	116.5,	128.3,	140.2,	147.4,	156.9,	164.7,	170.5,
10 days	91.2,	105.3,	111.9,	121.0,	126.6,	130.8,	143.2,	155.7,	163.2,	173.1,	181.3,	187.3,
12 days	102.5,	117.5,	124.6,	134.1,	140.0,	144.4,	157.4,	170.5,	178.3,	188.6,	197.0,	203.2,
16 days	124.3,	141.0,	148.8,	159.2,	165.6,	170.4,	184.4,	198.4,	206.8,	217.7,	226.7,	233.2,
20 days	145.5,	163.6,	172.0,	183.2,	190.1,	195.1,	210.1,	224.9,	233.8,	245.2,	254.6,	261.5,
25 days	171.4,	191.1,	200.1,	212.2,	219.6,	225.0,	240.9,	256.6,	266.0,	278.0,	287.9,	295.0,

Calculation of storage volume

30yr Storm Duration		Rainfall depth (from met.ie data)	Effective Area	Vol of rainfall	Attenuated Run-off 5l/sec	Storage (Vol of rainfall less the attenuated run-off)
Minutes	Hours	mm	sqm	cum	cum	cum
5		10.8	2104	22.7	1.5	21.2
10		15	2104	31.6	3	28.6
15		17.7	2104	37.2	4.5	32.7
30		22.2	2104	46.7	9	37.7
60	1	27.8	2104	58.5	18	**40.5**
120	2	34.8	2104	73.2	36	37.2
180	3	39.6	2104	83.3	54	29.3
240	4	43.5	2104	91.5	72	19.5
360	6	49.6	2104	104.4	108	0.0
540	9	56.6	2104	119.1	162	0.0
720	12	62.2	2104	130.9	216	0.0
1080	18	70.9	2104	149.2	324	0.0
1440	24	77.8	2104	163.7	432	0.0
2880	48	90.4	2104	190.2	864	0.0

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The required volume of storage is 40.5 cubic meters. The area of the soakway is 18x6m, 108sqm, the depth of storage required is 0.37m.

Sizing of Soakaway and Attenuation System

The plan area of the soakaway/attenuation tank is 18m x 6m. The required depth of the soakaway for a storm with a 10yr return period is 909mm. The required depth for an attenuation tank for a storm with a 30yr return period is 370mm. An overall depth for a combined soakaway and attenuation tank is recommended to be 1200mm, with an overflow pipe installed and 900mm above the base of the tank. The overflow will have a hydrobreak to attenuate the flow to 5l/sec and will connect to the public sewer in the road.

Design of collection system

The proposed surface water drainage proposal includes a gravity surface water collection system which incorporates an underground drainage pipe network.

All proposed drainage works is 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.

C1/SfB (29)

NSAI Agrément

IRISH AGRÉMENT BOARD
CERTIFICATE NO. 18/0401

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Pluvial Cube Attenuation and Infiltration Systems

Stürmen Sie Wasser Leitung System

NSAI Agrément (Irish Agrément Board) is designated by Government to carry out European Technical Approvals.

NSAI Agrément Certificates establish proof that the certified products are **'proper materials'** suitable for their intended use under Irish site conditions and in accordance with the **Building Regulations 1997 to 2017.**

PRODUCT DESCRIPTION:
This Certificate relates to the Pluvial Cube attenuation and infiltration system which comprises of modular polypropylene units which, in conjunction with a satisfactory civil engineering design, will act as either an attenuation or infiltration vessel as part of a sustainable drainage system.

The Pluvial Cube system consists of modular polypropylene units, low flow maintenance and self-cleaning channels.

USE:
The product is used as a subsurface stormwater management system, used for sub-surface water storage or as a soakaway to manage rain water run-off from impermeable surfaces. Subject to site conditions and restraints, the Pluvial Cube system modules can be built up to create the volumetric capacity required for

- Attenuation system
- Infiltration system.
- Or a combined attenuation/infiltration system.

MANUFACTURE AND MARKETING:
The product is manufactured and marketed by:

Alderburgh Ltd.
Solution House,
Dane Street,
Rochdale,
OL11 4EZ.
Tel: +44(0)1706 374416 Fax: 01706376785
Email:info@alderburgh.com

Readers are advised to check that this Certificate has not been withdrawn or superseded by a later issue by contacting NSAI Agrément, NSAI, Santry, Dublin 9 or online at http://www.nsai.ie

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NSAI Agrément

Part One / Certification 1

1.1 ASSESSMENT

In the opinion of NSAI Agrément, the Pluvial Cube system, if used in accordance with this Certificate, meets the requirements of the Building Regulations 1997 - 2017 as indicated in Section 1.2 of this Certificate.

1.2 BUILDING REGULATIONS 1997 to 2017

REQUIREMENT:

Part A – Structure

A1 - The Pluvial Cube system, as certified in this Certificate, can be designed to ensure that the combined dead and imposed loads are sustained and transmitted to the ground in compliance with CIRIA C737 *Structural and geotechnical design of modular geocellular drainage systems.*

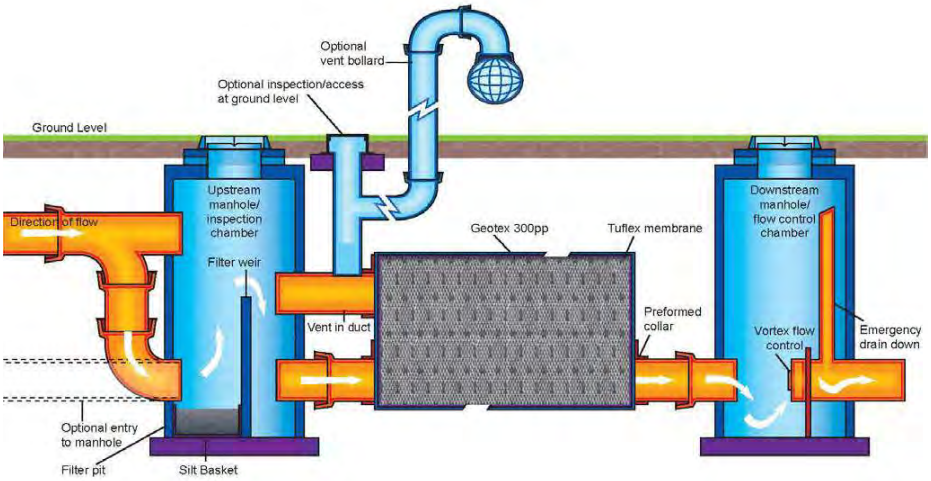
Part D - Materials & Workmanship

D3 – The Pluvial Cube system, as certified in this Certificate, is comprised of proper materials fit for their intended use (See Part 4 of this Certificate).

D1 – The Pluvial Cube system, as certified in this Certificate, meets the requirements of the building regulations for workmanship.

Part H – Drainage and waste water disposal.

H1 - The Pluvial Cube system, as certified in this Certificate, meets the requirements of the building regulations for the adequate disposal of surface water from the building.



Proposed Foul Wastewater discharge

The new site proposal includes 13 dwellings.

IW records show a 225mm foul sewer crossing the public road about 120m to the south of the site- this sewer was not located in the utility survey of the public road- however, it was located by Cork County Council and it is now proposed to connect to this manhole. Other options for the foul sewer connection were considered. There is an existing 150mm sewer serving Dr. O'Callaghan Park to the southwest of the site. It was proposed to connect to the sewer in Dr. O'Callaghan Park. Another alternative is to connect to the Irish Water sewer on the eastern side of the new school to the east of the proposed site- this route is achievable but will require approximately 300m of new sewer in the new public road serving the school. It was investigated to connect to the sewer in the main road 330m to the north of the site- this is not feasible without a pumping station.

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

Dry weather flows (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) = 13 x 600/24/60/60 = 0.090l/s

Foul Pipe Network is designed to carry a minimum wastewater volume of six times dry weather flows (6DWF).

6 DWF = 6 x 0.09 = 0.54 l/s

Typical Organic Loading :

TABLE 1: INFLOW WASTEWATER CHARACTERISTICS* FROM EPA STUDY (DOMESTIC SOURCES)

Parameter	Mean	Standard Deviation
SS	163	136
BOD_5	168	127
COD	389	310
$O\text{-}PO_4$	7.1	4.2
Total-N	40.6	19.0
$NH_3\text{-}N$	31.5	15.6
$NO_3\text{-}N$	0.25	0.41
$NO_2\text{-}N$	0.04	0.06
pH	7.5	0.5
Total-coli	1×10^8	2×10^8
E-coli	4×10^7	5×10^7

* all results in mg/l, except bacterial counts which are expressed in colony forming units, CFU per 100 ml

TABLE 2.2 TYPICAL CHARACTERISTICS OF URBAN WASTE WATER

Parameter	Concentration mg/l
BOD	100 - 300
COD	250 - 800
Suspended solids	100 - 350
Total nitrogen (as N)	20 - 85
Ammonia (NH_3 as N)	10 - 30
Organic phosphorus (as P)	1 - 2
Inorganic phosphorus (as P)	3 - 10
Oils, fats and grease	50 - 100
Total inorganic constituents (Na, Cl, Mg, S, Ca, K, Si, Fe)	100
Heavy metals (Cd, Cr, Cu, Pb, Hg, Ni, Ag, Zn)	<1mg/l each

ISO 9001 REGISTERED FIRM

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Proposed Water Supply.

The new site proposal includes 13 dwellings. It is proposed to connect to existing watermains in Mill Road, the public road on the eastern boundary of the site.
Please refer to proposed watermain layout.

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.

13 dwellings :13x150x2.7

Total average daily demand = 5,265 litres

The average day/peak week demand should be taken a 1.25 times the average daily domestic demand.
Total average day/peak demand = 5,625 x 1.25 = 7031 liters

The peak demand for sizing of the pipe network will normally be 2.1 times the average day, peak week demand.
Total average day/peak demand = 7031x 2.1 = 14,765 l/day or 0.171 l/sec

ISO 9001 REGISTERED FIRM

Preliminary Flood Risk Assessment

The site is not at risk from flooding.

The proposed development is approximately 60km from the sea and the site elevation is approximately 102m OD, hence tidal flooding is not a risk at this site.

The site is locally elevated within its environs, it approximately 20m higher than the town center of Kanturk, therefore pluvial flooding is not deemed a risk.

Fluvial flooding is not a risk at the site. There is a river approximately 450m to the south of the site which has a floodplain, this is approximately 20m lower than the proposed site. See the following excerpt from floodinfo.ie which indicates the extent of possible fluvial floodings approximately 450m from the site.

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Original Drawing Size A1

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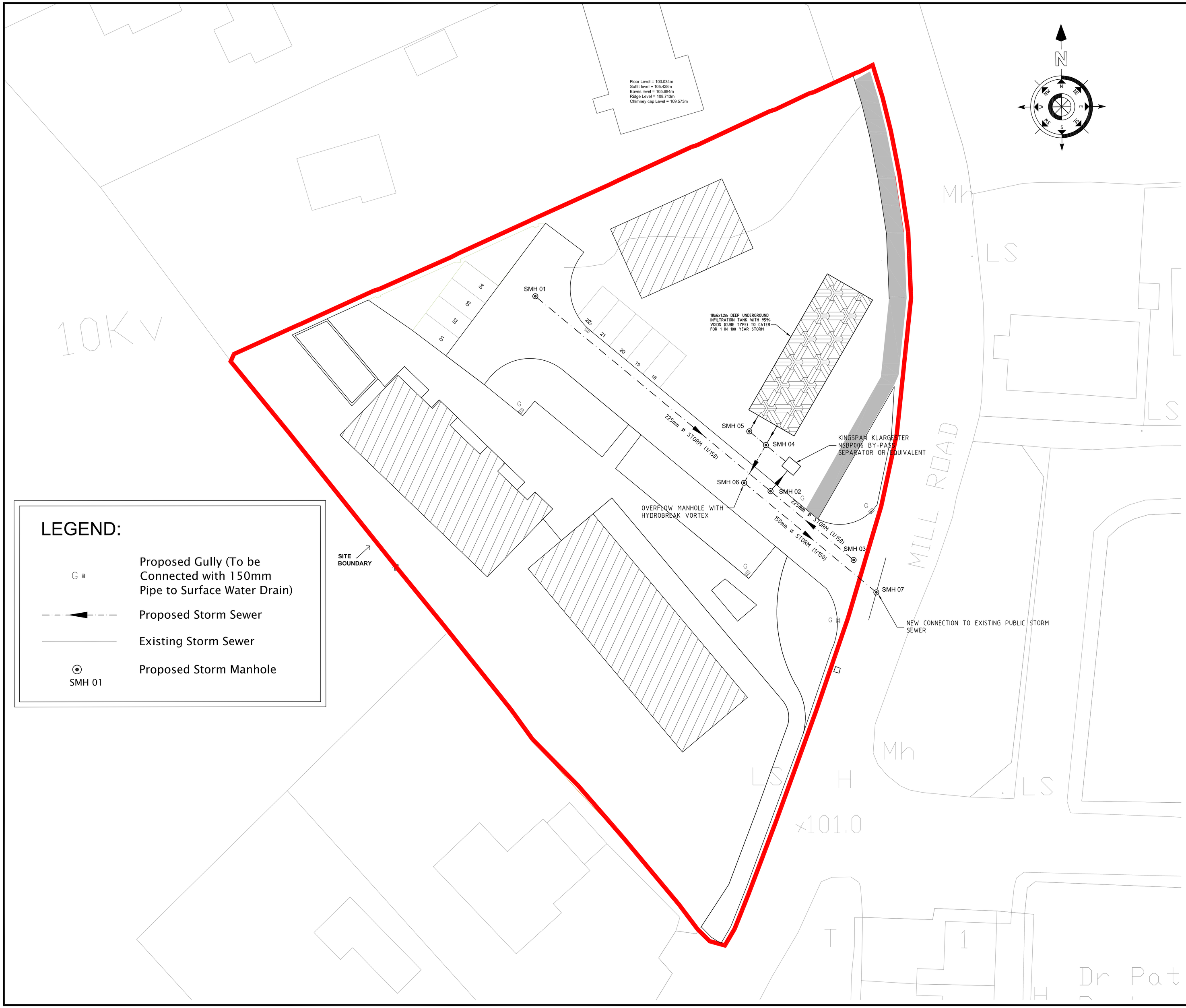
15. WORKS TO BE CARRIED OUT IN ACCORDANCE WITH CORK COUNTY COUNCIL DESIGN GUIDE FOR PROVISION OF SERVICES IN HOUSING ESTATES 2005 & RECOMMENDATIONS FOR SITE DEVELOPMENT WORKS FOR HOUSING AREAS 1998, PUBLISHED BY THE DEPARTMENT OF ENVIRONMENT & LOCAL GOVERNMENT.
16. SETTING OUT TO BE THE RESPONSIBILTY OF THE CONTRACTOR.



LEGEND:

G	Proposed Gully (To be Connected with 150mm Pipe to Surface Water Drain)
	Proposed Storm Sewer
	Existing Storm Sewer
SMH 01	Proposed Storm Manhole

Rev	Date	Drawn	Description	Ch'k'd
T1	June'23	TL	Re-Issued for Tender	BA
T	-	GR	Issued for Tender	BA

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RAY KEANE & ASSOCIATES
CONSULTING ENGINEERS
CIVIL | STRUCTURAL | PROJECT MANAGEMENT

Client:
CORK COUNTY COUNCIL

Project:
Proposed Residential Development
at Mill Road, Kanturk,
Co. Cork.

Drawing Title:
Proposed Storm Drainage Layout

Designed:	BA	Drawn:	GR	Date:	March '23
Eng Chk:	BA	Dwg. Chk:	BA	Scale:	As Shown
Project. No:	570				
Drawing No:	500			Status: Tender	Rev: T1

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Floor Level = 103.034m
Soffit level = 105.428m
Eaves level = 105.684m
Ridge Level = 108.713m
Chimney cap Level = 109.573m

FMH 01
FMH 02
FMH 03
FMH 04
IC
150mm ø FOUL
SITE BOUNDARY
REFER TO DRAWING 503
MILL ROAD
Mh
LS
Mhs
Dr Pat O'

LEGEND:

- Proposed Foul Sewer (Self Lay) Works Outside Red Boundary By Irish Water
- FMH 01 — Proposed Storm Manhole
- IC — Proposed Inspection Chamber (Refer to IW Detail STD-WW-13)

Rev	Date	Drawn	Description	Ch'k'd
T1	June'23	TL	Re-Issued for Tender	BA
T	-	GR	Issued for Tender	BA

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RAY KEANE & ASSOCIATES
CONSULTING ENGINEERS
CIVIL | STRUCTURAL | PROJECT MANAGEMENT

Client:
CORK COUNTY COUNCIL

Project :
Proposed Residential Development
at Mill Road, Kanturk,
Co. Cork.

Drawing Title :
Proposed Foul Drainage Layout

Designed:	BA	Drawn:	GR	Date:	March '23
Eng Chk:	BA	Dwg. Chk:	BA	Scale:	As Shown
Project. No:	570				
Drawing No:	501			Status: Tender	Rev: T1

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Floor Level = 103.034m
Soffit level = 105.428m
Eaves level = 105.684m
Ridge Level = 108.713m
Chimney cap Level = 109.573m

PROPOSED 63mmØ PE WATERMAIN

PROPOSED 100mmØ PE WATERMAIN

PROPOSED 100mmØ PE WATERMAIN TO CONNECT TO EXTG. IRISH WATER MAIN HERE

SITE BOUNDARY

AV

FH

WM

SV

BB

01 02 03 04

16 19 20 21 22

MILL ROAD

LS

×101.0

LEGEND:

- Existing Irish Water Main
- Proposed 100mmØ HDPE Watermain (Self Lay). Works Outside Red Boundary By Irish Water
- Proposed 63mmØ HDPE Watermain
- SV Proposed Sluice Valve
- AV Proposed Air Valve
- FH Proposed Fire Hydrant
- WM Proposed Water Meter
- BB 25mm Connection Feed & Boundary Watermeter Box

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CONSULTING ENGINEERS
CIVIL | STRUCTURAL | PROJECT MANAGEMENT

Client:
CORK COUNTY COUNCIL

Project:
Proposed Residential Development
at Mill Road, Kanturk,
Co. Cork.

Drawing Title:
Proposed Watermain Layout

Designed:	BA	Drawn:	GR	Date:	March '23
Eng Chk:	BA	Dwg. Chk:	BA	Scale:	As Shown
Project. No:	570				
Drawing No:	502			Status: Tender	Rev: T1

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LEGEND:

Proposed Foul Sewer (Self Lay) Works Outside Red Boundary By Irish Water

FMH 01 — Proposed Storm Manhole

IC — Proposed Inspection Chamber (Refer to IW Detail STD-WW-13)

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Client:
CORK COUNTY COUNCIL

Project:
Proposed Residential Development
at Mill Road, Kanturk,
Co. Cork.

Drawing Title:
Proposed Foul Drainage Layout
Extended Area

Designed:	BA	Drawn:	GR	Date:	March '23
Eng Chk:	BA	Dwg. Chk:	BA	Scale:	As Shown
Project. No:	570				
Drawing No:	503	Status:	Tender	Rev:	T1