



**PercolationTests.ie**  
Planning Assessments & Land Surveys

Tel: 087 6636 757    Email: [percolationtests@gmail.com](mailto:percolationtests@gmail.com)    Web: [www.percolationtests.ie](http://www.percolationtests.ie)

# **BRE Digest 365 Report.**

Prepared on behalf of:

**Edmondstown Golf Club**

At:

**Rathfarnham,  
Co. Dublin.**



# **PercolationTests.ie**

## **Planning Assessments & Land Surveys**

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### **Scope of Report.**

The findings of this report are the result of an on-site infiltration test. Interpretations and conclusions included in the report are based on knowledge of the ground conditions following detailed investigations, as well as the regional soils, subsoils and bedrock geology, and the experience of the author. David Ryan has prepared this report in line with the best current practice and with all reasonable skill, care and diligence in consideration of the limits imposed by the survey techniques used and resources devoted to it by agreement with the client.

David Ryan accepts no responsibility for any matters arising if any recommendations contained in this document are not carried out, or are partially carried out, without further advice being obtained from David Ryan.

**Cillron Limited - PercolationTests.ie**

Newtownmoyaghy, Kilcock, Co. Kildare.  
www.percolationtests.ie  
Tel: 087 6636757

**BRE Digest 365 Test**

Revision: 1.00

Job No: Soakpit 1 Page: C/01

Section: Edmondstown Golf Club

Prepared By: DR Date: 19/11/2021

**ALTERNATIVE SOAKAWAY SIZES**

trench soakaways			
width of trench [mm]:	450	600	900
required trench length [m]:	25.66	20.72	14.98
ring soakaways			
diameter of ring [mm]:	1500	2100	2400
required pit diameter [m]:	2.77	2.78	2.77

**SUMMARY OF CALCULATIONS**

critical design rainfall duration $t_{crit}$	=	360	min
required storage volume $V_{req}$	=	12.63	$m^3$
provided storage volume $V_{prov}$	=	14.96	$m^3$
utilisation factor =		0.84	.OK
required time to discharge 50% $t_{50}$	=	8.78	hours
utilisation factor =		0.37	.OK

\* Based on effective depth and number of pits as in Soakaway Data table

**GENERAL DATA**

site location:	██████████ Ireland
soakaway type:	infilled pit or trench
impermeable area drained to soakaway 'A' [ $m^2$ ]	= 350
60 min rainfall depth of 5 year return period 'R' [mm]	= 16
M5-60 to M5-2d rainfall ratio 'Y'	= 0.28
allowance for climate change:	20%

**SOAKAWAY DATA**

soakaway width 'W' [m]	= 2.50
soakaway length 'L' [m]	= 7.00
total depth from ground level 'D <sub>0</sub> ' [m]	= 1.20
depth to drain invert level 'D <sub>d</sub> ' [m]	= 0.30
soakaway effective depth 'D <sub>eff</sub> ' [m]	= 0.90
free volume in infill aggregate [%]	= 95

**SOIL INFILTRATION DATA**

allowance for infiltration through soakaway base:	50%
available on-site infiltration test results:	<input checked="" type="radio"/> Yes <input type="radio"/> No
use soakage trial pit table below	
internal surface area of trial pit 'a <sub>p50</sub> ' [ $m^2$ ]	= 2.13
storage volume between 75-25% 'V <sub>d</sub> ' [ $m^3$ ]	= 0.27
time for water to fall from 75-25% 't <sub>p</sub> ' [min]	= 154.50
soil infiltration rate 'Y' [m/s]	= 1.37E-05

**SOAKAGE TRIAL PIT DATA**

soakage trial pit width 'W <sub>t</sub> ' [m]	= 0.90
soakage trial pit length 'L <sub>t</sub> ' [m]	= 1.20
total depth from ground level 'D <sub>ts</sub> ' [m]	= 1.20
depth to pipe invert level 'D <sub>tp</sub> ' [m]	= 0.70
soakage trial pit effective depth 'D <sub>teff</sub> ' [m]	= 0.50
free volume in infill aggregate [%]	= 100

NOTE: faces of excavation assumed to be vertical

**Additional trial hole showed no seasonal high water table above 1.8m bgl.**

**REQUIRED STORAGE CAPACITY PER RAINFALL DURATION**

rainfall duration [min]	rainfall factor Z1	M6-D rainfalls [mm]	M30-D		Ignore		Ignore		outflow from soakaway [ $m^3$ ]	required storage [ $m^3$ ]
			Z2	rainfalls [mm]	inflow [ $m^3$ ]	Z2	rainfalls [mm]	inflow [ $m^3$ ]		
5	0.33	5.21	1.44	9.02	3.16				0.07	3.09
10	0.48	7.57	1.47	13.31	4.66				0.14	4.52
15	0.58	9.14	1.48	16.24	5.69				0.21	5.47
30	0.76	11.96	1.49	21.41	7.49				0.43	7.07
60	1.00	15.70	1.49	28.08	9.83				0.85	8.98
120	1.27	19.88	1.47	35.15	12.30				1.70	10.60
240	1.63	25.53	1.46	44.67	15.84				3.41	12.23
360	1.86	29.20	1.45	50.67	17.73				5.11	12.63
600	2.22	34.79	1.43	59.66	20.88				8.52	12.36
1440	3.05	47.85	1.38	79.36	27.77				20.44	7.34

\* Z2 is a growth factor from M6 rainfalls

**SOAKAGE TRIAL PIT INFILTRATION TEST RESULTS**

water level measurement N°:		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Soakage Trial 1	time [min] =	0	60	125																
	depth to water [m] =	0.80	0.90	1.00																
Soakage Trial 2	time [min] =	0	75	155																
	depth to water [m] =	0.80	0.90	1.00																
Soakage Trial 3	time [min] =	0	82	175																
	depth to water [m] =	0.80	0.90	1.00																

USE FIGURED DIMENSIONS IN PREFERENCE TO SCALING FROM DRAWINGS  
 ALL MEASUREMENTS, HEIGHTS, AREAS, LEVELS AND CONSTRUCTIONAL  
 DETAILS TO BE CHECKED AND VERIFIED BY THE BUILDING CONTRACTOR,  
 SUB-CONTRACTOR OR DIRECT LABOUR CONTRACTOR PRIOR TO THE  
 COMMENCEMENT OF ANY WORKS OR AGREEMENTS

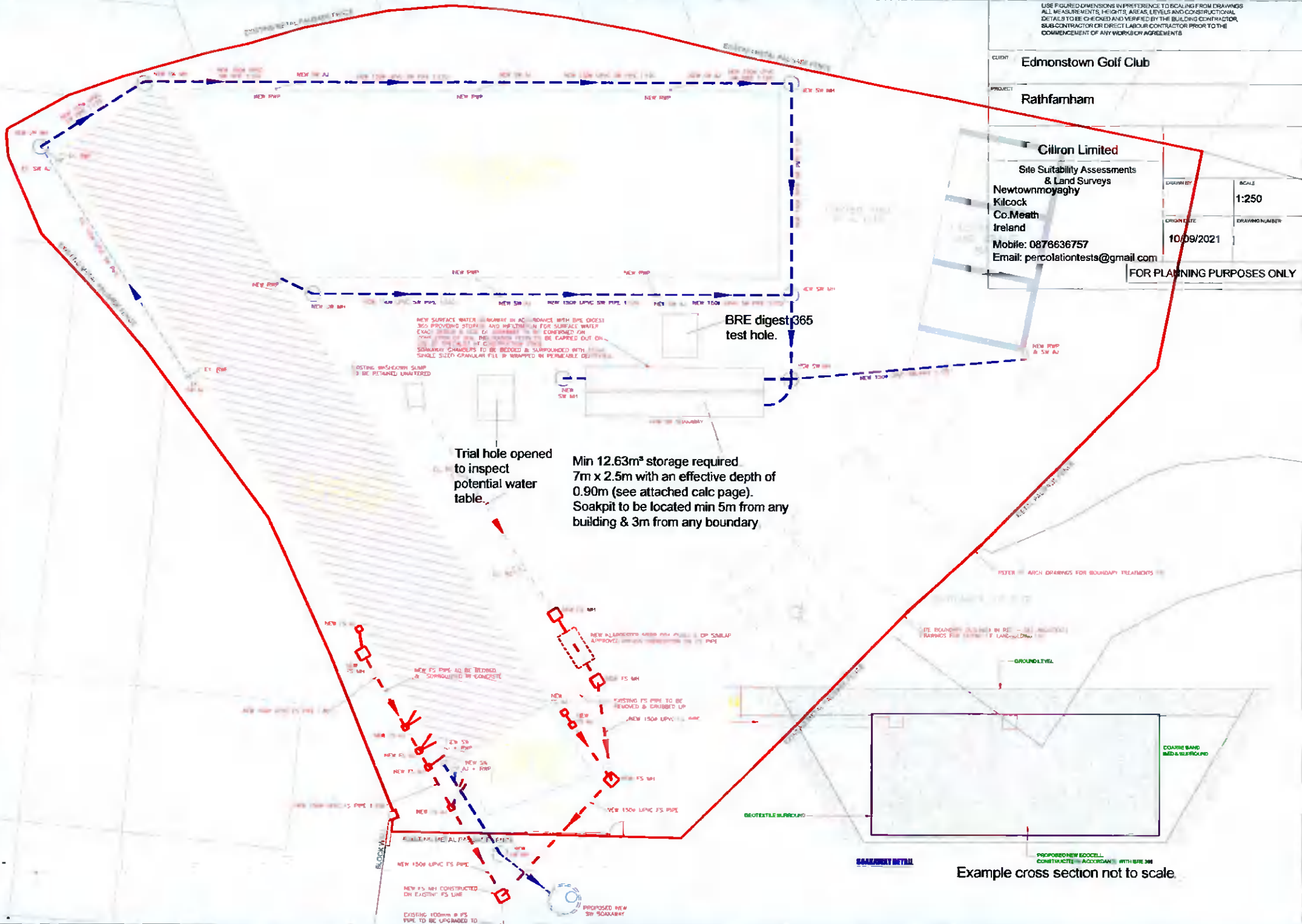
CLIENT **Edmonstown Golf Club**

PROJECT **Rathfamham**

**Cillron Limited**  
 Site Suitability Assessments  
 & Land Surveys  
 Newtownmoyaghy  
 Kilcock  
 Co.Meath  
 Ireland  
 Mobile: 0876636757  
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DRAWN BY	SCALE
ORIGIN DATE	DRAWING NUMBER
	1:250
10/09/2021	

FOR PLANNING PURPOSES ONLY



Trial hole opened to inspect potential water table.

Min 12.63m³ storage required  
 7m x 2.5m with an effective depth of 0.90m (see attached calc page).  
 Soakpit to be located min 5m from any building & 3m from any boundary

Example cross section not to scale.

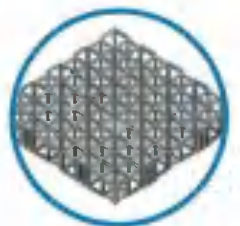
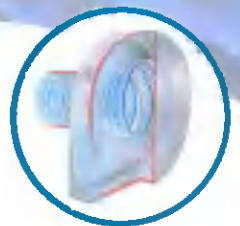
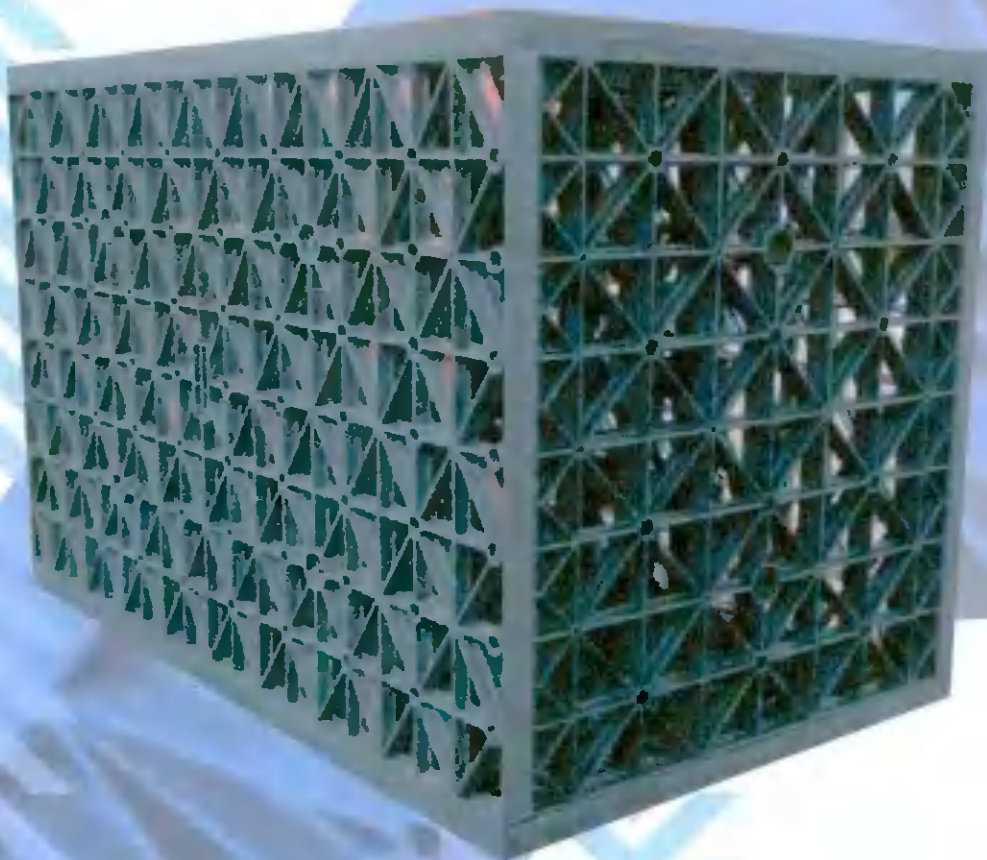


# Modular Geo-Void Systems

Total Water Management

## ESS EcoCell

Ecological Tank Systems



ENVIRONMENTAL SUSTAINABLE SOLUTIONS LTD

# Environmental Sustainable Solutions

**Welcome to Environmental Sustainable Solutions; specialist suppliers and designers of geocomposites and water re-use systems. Environmental Sustainable Solutions can help you achieve innovative results for all your requirements:-**

- Stormwater Management
- Gas Barrier Protection
- Stormwater Attenuation
- Contaminated Land Development
- Stormwater Drainage
- Ground Stabilisation
- Rainwater Recycling Management
- Structural Waterproofing
- Gas Venting Systems
- Damp-proofing projects

Over the last 12 years Environmental Sustainable Solutions, and associated companies, have designed and installed thousands of water recycling, drainage and attenuation tank systems for schools, car parks, retail parks, offices and sports arenas throughout Ireland, UK, Europe and the Middle East.

Our wide range of environmental protection products, surface water drainage modules and modular water storage tank systems provides maximum design flexibility for engineers and architects working on even the most demanding of storm water storage and recycling projects.

## Stormwater Management And Design

Stormwater is the phrase used to describe the excess rainwater that flows from rooftops, roads, car parks and other buildings. This water can contain many pollutants picked up from roofs and highways. In extreme weather conditions sudden heavy downpours of rain can cause major environmental disasters. Using our Rainmanager products; stormwater can not only safely be removed, but it can be stored and recycled for commercial and domestic use.

### How it works - ESS Attenuation Tank

Stormwater enters the attenuation tank via the inlet manhole, which incorporates a silt collection sump and a galvanised leaf collection basket. Water passes through the tank and exits through the outlet manhole, which contains an AquaBrake flow control device.

This flow control device regulates the release rate of water from the tank, and in so doing, enables the tank to fill. As a result of water entering the tank at a greater rate than it can exit, the void space then fills with water. While the tank fills, air is vented from the tank.

The Inlet/Outlet pipe will act as a flushing channel. This perforated pipe is wrapped completely in High Flow Filtering Geotextile, which prevents silt entering the block area. As the tank continues to empty at a pre-determined rate, air re-enters the tank via the same air vent system. **The roof of the completed tank must be lower than the lowest gully trap on site.**

### Benefits

- 100% sealed tank
- Full installation service provided
- 12 years experience as market leader
- Quick installation – reduce site access delays
- Increased land usage – tanks are sub surface
- Economical – generally more cost efficient than any other equivalent sealed tank
- Cost effective – reduced costs for excavation and disposal of material
- Modular – easy to create any shape
- Strong – designed to support shear loading
- Lightweight – no cranes required
- Determinate volume – one cubic metre of matrix tank modules contain 950 litres of water, whereas stone fill will only provide 300 litres of storage per cubic metre.

### Soakaway

The soakaway is normally best built as a long narrow structure.

The inlet pipe comes in at roof level and faces downwards so that the water can percolate into the tank.

The blocks are wrapped in Geotextile, to protect them and also to keep clay from filling up the void.

An air vent pipe is installed on the highest point with a cowl on top or vented back to an inlet manhole.

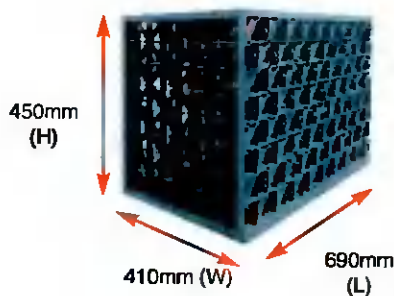
There is no outlet from a soakaway, therefore no flow control unit is required.

# Protecting the Environment

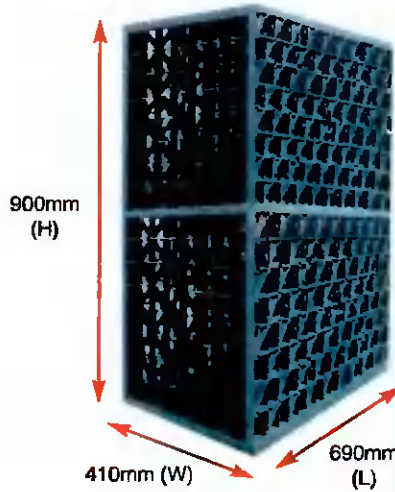
## Stormwater Storage Tank

### SUITABLE FOR USE UNDER:

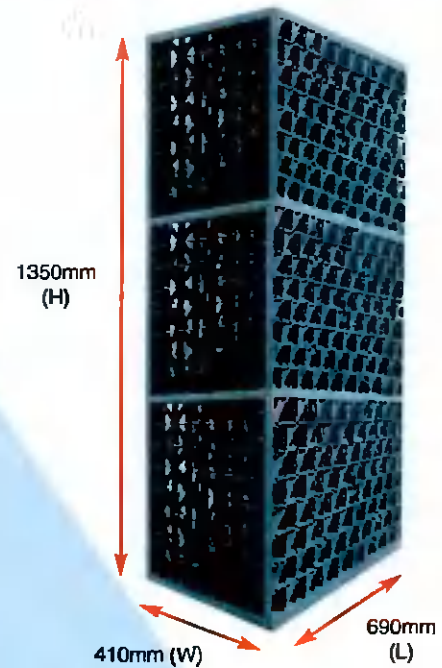
- Roadways
- Car parks
- Green areas



**Single**  
8 Modules/m<sup>3</sup>  
Flowrate - 2300 l/min



**Double**  
4 Modules/m<sup>3</sup>  
Flowrate - 4600 l/min



**Triple**  
2.6 Modules/m<sup>3</sup>  
Flowrate - 6900 l/min

### Notes:

Blocks must be positioned in the correct orientation.  
See opposite above

## SPECIFICATION (SINGLE)

Weight (maximum)	9.17kg
Crush Strength (up to)	400kN/m <sup>2</sup>
Lateral Strength	80kN/m <sup>2</sup>
Minimum Cover (green areas)	500mm
(trafficked areas)	650mm
Maximum Cover	3m
Material	Polypropylene
Void Ratio (Internal)	>95%

### Design Requirements:

- Tank storage capacity (m<sup>3</sup>)
- Depth restrictions
- Location (Road, Car Park, Green Area)
- Design constraints on site

## DESIGN CRITERIA

The attenuation tank is constructed using matrix module blocks. These blocks can take passing loads of up to 40 tonnes/m<sup>2</sup>. The void ratio of each block is 95%. The blocks are made from polypropylene.

The tank is sealed with a layer of Tuflex membrane, which is fully welded together to form a 100% seal. All pipe penetrations are fully sealed to the membrane. The Tuflex membrane is protected by a layer of heavy duty protection geotextile, to prevent damage from construction or backfilling. A number of air extraction vents/flushing points are placed in the roof of the tank.

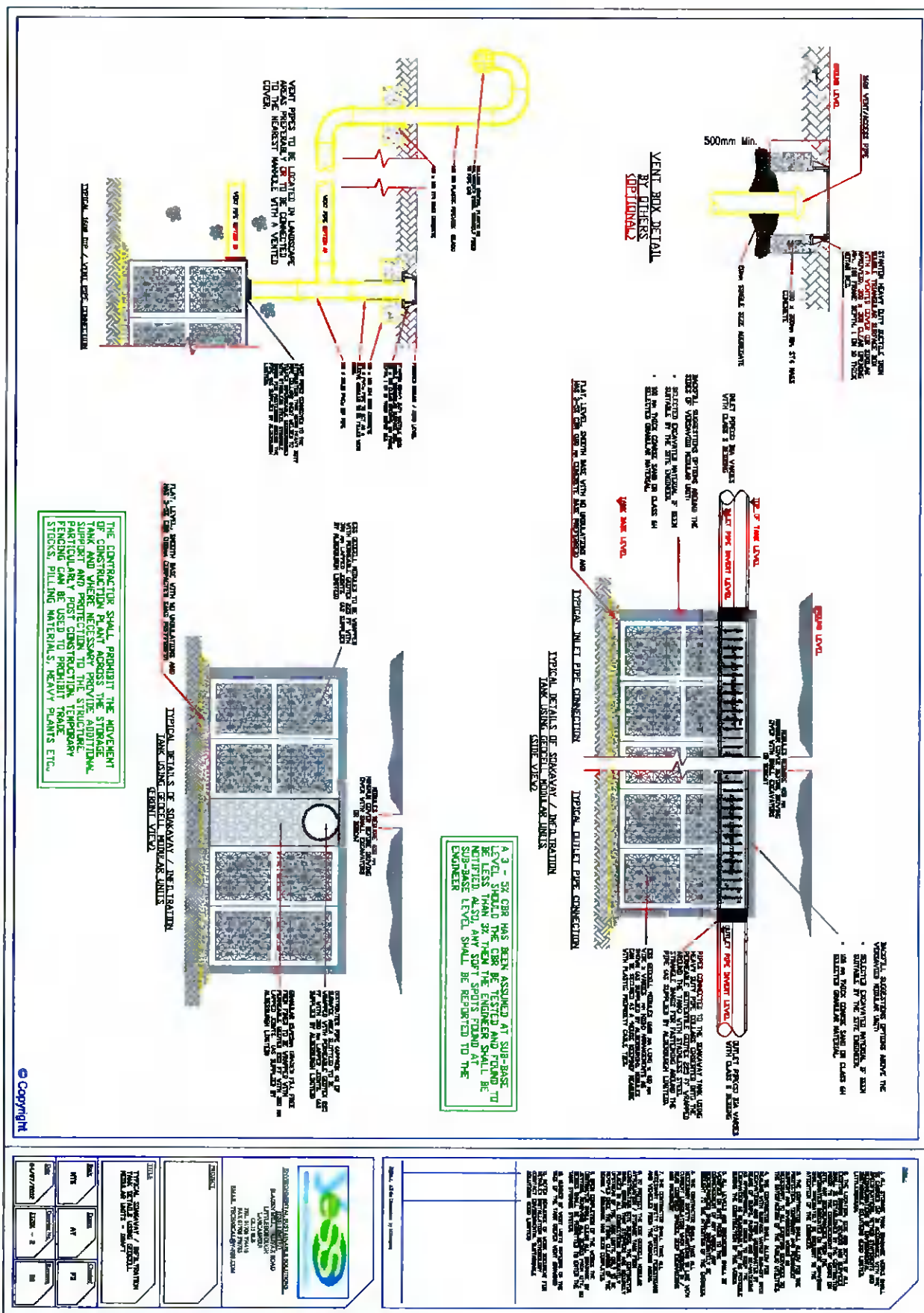
### Note:

**It is vital that the underground tanks are fully sealed, otherwise ground water and silt particles may enter the void space and use up capacity.** Preferably, the base of the tank should be 500mm above the ground water level. Otherwise ground water relief measures should be implemented.

A set of loading calculations specific to the site requirement will be done by ESS and submitted on all tanks

# Infiltration System

## Typical arrangement using ESS Ecological Tank System for water quality







# Infiltration Swales & Underground Channels

Please refer to separate data sheets for the following products

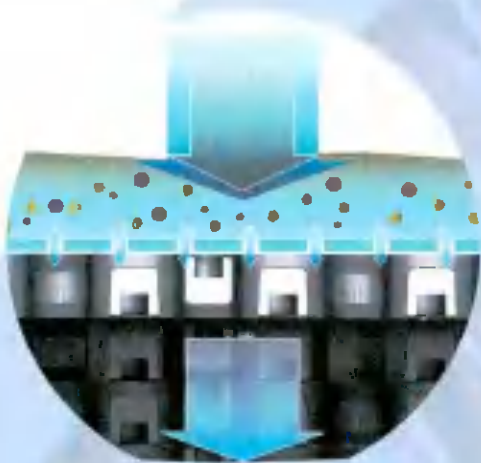
## Modular VersaVoid System



### Benefits

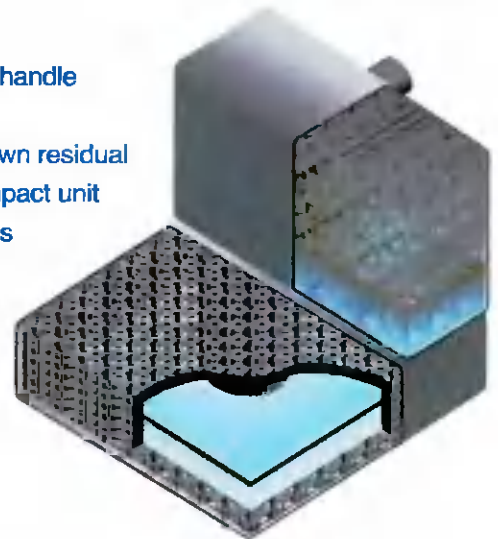
- **Quick**  
Reduce site access delays
  - **Lightweight**  
No cranes required
  - **Strong**  
Designed for maximum anticipated loads
  - **Maintenance Free Tank**  
All debris and sediment is pre-filtered
  - **Determinate Volume**  
One cubic metre of Tank modules contain 950 litres of water
  - **Cost Effective**  
Reduces excavation and disposal by up to 5 x compared with conventional soak wells
  - **High Infiltration**  
98% void surface area
  - **Totally Modular**  
For greatest flexibility designed to cope. Units start at 300mm deep
- for shallow inverts to 3050mm+ deep in 250mm increments.
- **Designed by Engineers for Engineers** – to specify with confidence.
  - **Designing out Problems** with such systems (access, maintenance, loading etc.)
  - **Designing in Answers** to design requirements.
  - **Total 3D Access**  
For total maintenance with total confidence.
  - **Structurally Designed** with built in safety factor to carry all loads with complete confidence. 16 clear vertical access chambers per m<sup>2</sup>.
  - **Total Void Creation**  
With the greatest strength from any modular systems.

## Oil Filtration

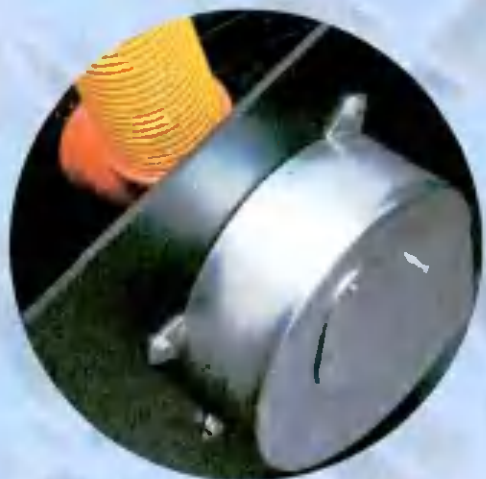


### Benefits

- Source control designed to handle catastrophic spillages
- Capture, filter and break down residual hydrocarbons - all in one compact unit
- Self-maintaining ecosystems decompose hydrocarbon compounds and clean filters
- Load bearing, modular components provide up to 200t/m<sup>2</sup> loading capacity

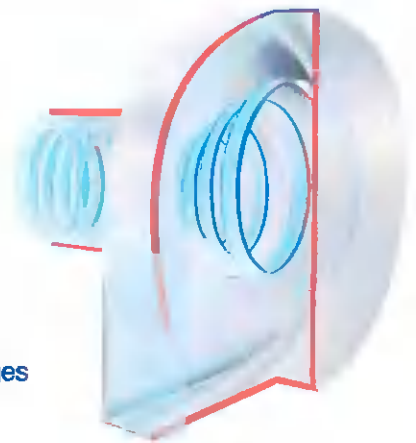


## Aquabrake



### Benefits

- **Cost Savings**  
Can reduce upstream storage requirements by up to 30%.
- **Durability**  
Corrosion resistant stainless steel.
- **No energy requirements**  
Self-activating solution with no moving parts.
- **Clog Resistant**  
AquaBrake design prevents blockages likely to occur in traditional orifices.
- **Flexible Design**  
Several options for attachment available.



# The ESS CombiSwale

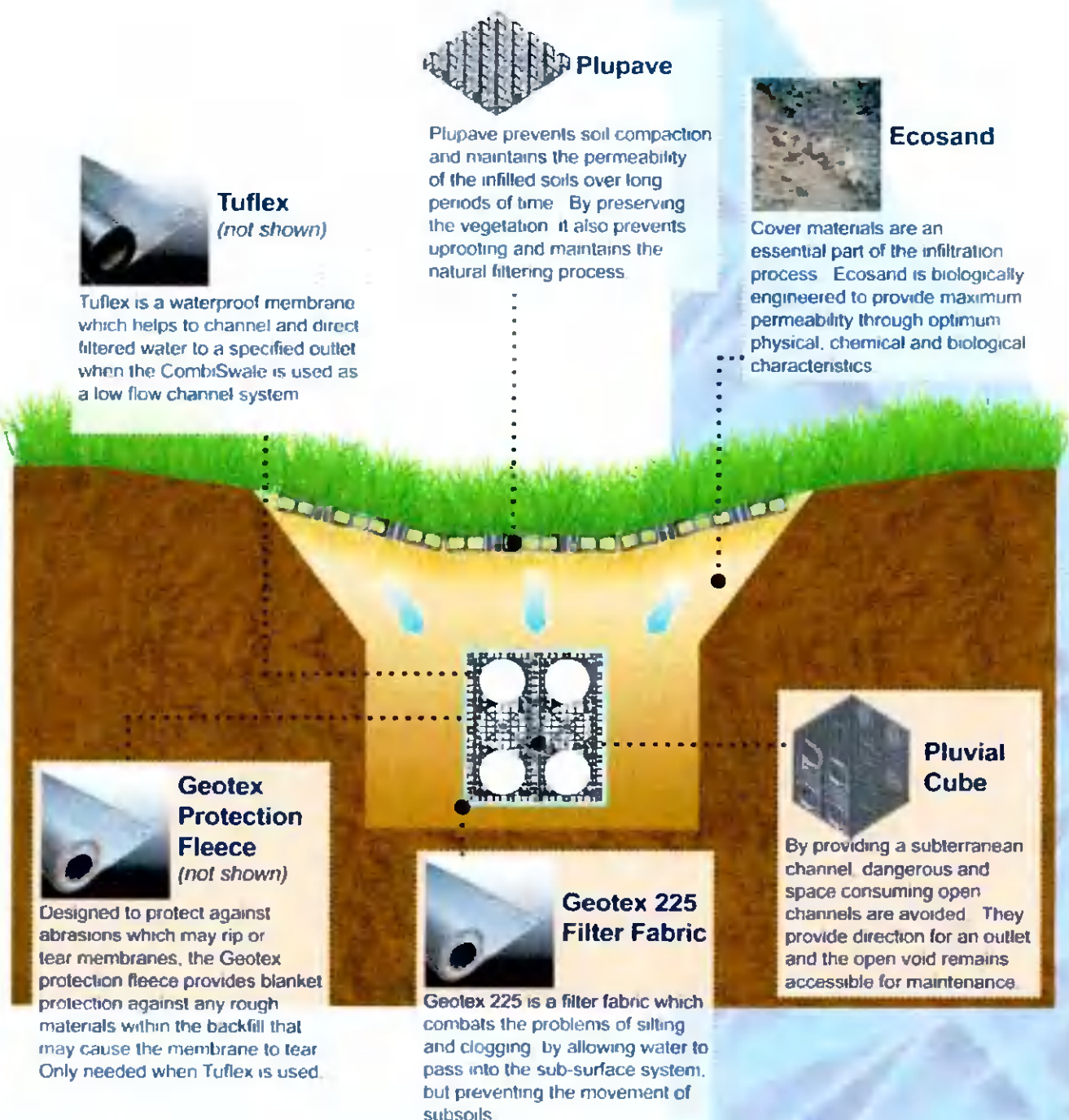
Please refer to separate data sheets for the following products

## Water Sensitive Urban Channels

### Surface and Sub-Surface Water Treatment

By combining surface and sub-surface channeling and treatment solutions, ESS has created the ideal in bioswale water management.

The CombiSwale system includes the addition of permeable sub-surface waterways that further restore water quality and recharge the natural environment. The sub-surface ESS channel system provides a unique way of working with nature to solve the enormous problems currently associated with open concrete channels and swales.



All products are manufactured to the highest quality, being subject to rigid quality control. However, the company cannot control conditions of application and use of its products, thus any warranty, written or implied, is given in good faith for materials only. ESS Ltd will not accept any responsibility for damage or injury arising from storage handling, misapplication or misuse of its products. All transactions are subject to our standard condition of sale, copies of which are available on request.

To find out more about these systems and products please contact us



### **Environmental Sustainable Solutions Ltd**

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[http: www.y-ess.com](http://www.y-ess.com)

An Alderburgh Group Company

E&OE. Without Guarantee.

Met Eireann  
Return Period Rainfall Depths for sliding Durations  
Irish Grid: Easting: 319075, Northing: 232626,

DURATION	Interval		Years													
	6months,	1year,	2,	3,	4,	5,	10,	20,	30,	50,	75,	100,	150,	200,	250,	500,
5 mins	2.6,	3.7,	4.2,	5.1,	5.7,	6.2,	7.8,	9.6,	10.7,	12.4,	13.9,	15.1,	16.8,	18.2,	19.4,	N/A
10 mins	3.6,	5.1,	5.9,	7.2,	8.0,	8.7,	10.8,	13.3,	15.0,	17.3,	19.4,	21.0,	23.5,	25.4,	27.0,	N/A
15 mins	4.2,	6.0,	7.0,	8.4,	9.4,	10.2,	12.7,	15.7,	17.6,	20.3,	22.8,	24.7,	27.6,	29.9,	31.8,	N/A
30 mins	5.6,	7.8,	9.0,	10.8,	12.1,	13.0,	16.2,	19.7,	22.0,	25.3,	28.2,	30.5,	34.0,	36.7,	38.9,	N/A
1 hours	7.3,	10.2,	11.7,	14.0,	15.5,	16.7,	20.5,	24.8,	27.6,	31.5,	35.0,	37.7,	41.8,	45.0,	47.7,	N/A
2 hours	9.7,	13.3,	15.2,	18.0,	19.9,	21.3,	26.0,	31.2,	34.5,	39.3,	43.4,	46.6,	51.5,	55.3,	58.4,	N/A
3 hours	11.4,	15.5,	17.7,	20.8,	23.0,	24.6,	29.8,	35.6,	39.4,	44.6,	49.3,	52.8,	58.2,	62.3,	65.7,	N/A
4 hours	12.8,	17.3,	19.7,	23.2,	25.5,	27.2,	32.9,	39.2,	43.3,	48.9,	53.9,	57.6,	63.4,	67.9,	71.5,	N/A
6 hours	15.1,	20.2,	22.9,	26.8,	29.4,	31.4,	37.8,	44.8,	49.3,	55.6,	61.1,	65.3,	71.6,	76.5,	80.5,	N/A
9 hours	17.8,	23.7,	26.7,	31.1,	34.0,	36.3,	43.4,	51.2,	56.3,	63.2,	69.3,	73.9,	80.9,	86.2,	90.6,	N/A
12 hours	20.0,	26.4,	29.7,	34.6,	37.7,	40.2,	47.9,	56.4,	61.8,	69.3,	75.7,	80.7,	88.2,	93.9,	98.6,	N/A
18 hours	23.5,	30.8,	34.6,	40.1,	43.6,	46.4,	55.0,	64.5,	70.5,	78.7,	85.9,	91.3,	99.6,	105.9,	111.0,	N/A
24 hours	26.4,	34.4,	38.5,	44.5,	48.4,	51.4,	60.7,	70.9,	77.4,	86.2,	93.9,	99.8,	108.6,	115.3,	120.7,	139.4
2 days	32.1,	41.1,	45.6,	52.1,	56.3,	59.5,	69.5,	80.2,	87.0,	96.2,	104.2,	110.1,	119.1,	125.9,	131.5,	150.2
3 days	36.7,	46.4,	51.3,	58.3,	62.8,	66.2,	76.7,	88.0,	95.1,	104.7,	112.9,	119.1,	128.3,	135.3,	141.0,	160.2
4 days	40.7,	51.1,	56.3,	63.7,	68.4,	72.0,	83.1,	94.8,	102.2,	112.1,	120.6,	127.0,	136.5,	143.7,	149.5,	169.1
6 days	47.8,	59.3,	65.0,	73.0,	78.2,	82.1,	94.1,	106.7,	114.5,	125.1,	134.1,	140.8,	150.8,	158.4,	164.5,	184.9
8 days	54.0,	66.5,	72.6,	81.2,	86.8,	90.9,	103.7,	117.0,	125.3,	136.4,	145.8,	152.9,	163.4,	171.2,	177.5,	198.7
10 days	59.6,	73.0,	79.5,	88.7,	94.5,	98.9,	112.4,	126.4,	135.0,	146.7,	156.5,	163.8,	174.7,	182.8,	189.4,	211.2
12 days	64.9,	79.1,	86.0,	95.6,	101.7,	106.3,	120.4,	135.0,	144.0,	156.1,	166.3,	173.9,	185.1,	193.5,	200.3,	222.8
16 days	74.7,	90.2,	97.8,	108.3,	114.9,	119.9,	135.1,	150.8,	160.4,	173.3,	184.2,	192.2,	204.1,	213.0,	220.1,	243.8
20 days	83.7,	100.5,	108.6,	119.9,	127.0,	132.3,	148.5,	165.1,	175.3,	188.9,	200.3,	208.8,	221.3,	230.6,	238.1,	262.9
25 days	94.2,	112.4,	121.2,	133.3,	140.9,	146.6,	163.9,	181.6,	192.5,	206.9,	218.9,	227.9,	241.1,	250.8,	258.7,	284.6

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](http://www.met.ie/climate/dataproducts/Estimation-of-Point-Rainfall-Frequencies_TN61.pdf)



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Site during testing -  
19/11/2021



BRE digest test hole -  
19/11/2021



Trial hole. Land fill observed  
and no water table above  
1.8m bgl. 19/11/2021



Trial Hole During Testing.



Trial Hole During Testing.



You're safe with *Sound*.

Sound Insurance  
Unit 7 Burnell Court  
Northern Cross  
Malahide Road  
Dublin 17

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T: +353 1 524 2800

[sound.ie](http://sound.ie)

David Ryan  
Newtownmoyaghy  
Kilcock  
Co Meath

Date: 06/04/2021  
Reference: RYDA01001

### INSURANCE CERTIFICATE

To Whom It May Concern

We confirm we act as Insurance Brokers to the above and set out below a summary of cover we have arranged:

**Business Description:** *Soil Engineer (Percolation Testing)*

#### PROFESSIONAL INDEMNITY

<b>Policy No:</b>	<b>PID00024862</b>
<b>Provider:</b>	<b>Optio Europe Ltd</b>
<b>Insurer:</b>	<b>Accredited Insurance (Europe) Ltd</b>
<b>Period of Insurance:</b>	<b>04/03/2021 to 03/03/2022</b>
<b>Limit of Indemnity:</b>	<b>€1,000,000</b>

*Subject always to Insurers policy wording, warranties, conditions, restrictions & exclusions a copy of which is available on request.*

We trust this is in order but if you have any queries, please do not hesitate to contact us.

Yours sincerely,

Gary Kinsella  
Commercial Broker  
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E: [Gary@sound.ie](mailto:Gary@sound.ie)