HYDROCARE
ENVIRONMENTAL LTD

Environmental Consultants
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Job Ref: *22-460* **Date:** 11 January 2023

FAO: Desmond Halpin Planning Agent

RE: Soakaway Design per BRE 365

Client: Mary Dalton

Location: 146 St Maelruans Park, Tallaght, Dub 24

Dear Desmond,

We have designed the soakaway per BRE 365 & C697 based on the total impermeable area outlined below, as provided by yourself, and Met Eireann's Extreme Rainfall Return Periods.

Site information supplied by:
Desmond Halpin Planning Agent 15 Carriglea Drive, Firhouse, Dublin 24

Total Impermeable Area: 60.00 m^2

Rainfall Information as per Met Eireann:

Data for Kilmashogue, Dublin
30 year return period

Duration =	60 mins
Rainfall Depth =	34.50 mm
Plus 10% climate change =	37.95 mm

The void ratio for the trench fill was set at 30% (0.3) to accommodate the use of granular fill material, i.e. Rounded gravel. The safety factor was taken as 1.

Soil Infiltration Rate:			
Tests carried out on:	29/11/2022	Base of test:	1.2m BGL
		WTL:	None
Calculated as per BRE 365:	1.03E-06 m/sec (see calculation sheet for details)		

The total impermeble area is ca. 60 square metres and the runoff coefficient is to be set at 1.0 as per BRE 365.

Inflow from:			
	Proposed impermeable areas:	**Area (m^2)**	**Runoff Volume (m3)**
1	Proposed Dwelling House Roof	60	2.277
2	0	0	0
3	0	0	0
4	0	0	0
	Total inflow from:	60.00	2.277

The depth of the soakaway pit is set at 1.2m below the invert level of the drain. According to BRE 365 method, the pit was calculated as.

10 m L x 1 m W x 1.2 m D

Storage required in soakaway (Inflow - Outflow):	2.23 m^3
Capacity of pit required to accommodate fill material 30% void:	7.43 m^3
Actual capacity of calculated soakaway:	12.00 m^3

The soakaway shall be constructed in trenches as outlined below:

1 no. trenches:

Trench No. 1 * 10 m L x 1 m W x 1.2 m D Volume: 12 m^3

Total Volume of 12 m^3

***As this 10m long soakaway cannot be achieved due to minimum separation distance requirements we are proposing a 4m long soakaway x 1m wide x 1.2m deep with a high level overflow to the surfacewater system - see surfacewater drawing attached**

NB

During the design process, a Silt Trap **must** be incorporated into any drains discharging into the soakaway system. All inflow from permeable paved areas must pass through a suitable geotextile to ensure filtration of fines.

NB

Any paved surface runoff or runoff from a Car parking area **must** pass through an oil interceptor \ hydrocarbon retention geotextile before discharge to the soakaway.

NB

Please note that for the purpose of this design, the fill material used must have no less free volume than 30%.

NB

This design will comply with BRE 365's 24-hour maximum limit for Half-Empty time, with a half empty time of 22 hrs 47 mins

NB

The base of the soakaway has **not** been included in the design calculations.

NB

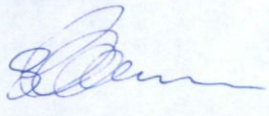
All elements of the soakaway **must** be well maintained by suitable professionals, *i.e. Silt Traps must be regularly cleaned.*

NB

Please note that all relevant aspects of BRE365 **must** be taken into account in the design and installation of this Soakaway system, eg. Min. 5m separation distance from building foundations.

Hoping this is to your Satisfaction

Yours sincerely,



Seán O'Connor, Masters in Applied Science, Dip. in Public Health, P.G Dip. in Environmental Engineering

Hydrocare Environmental Ltd. - BRE365 Design Calculations

CLIENT: **Mary Dalton**

LOCATION: **146 St Maelruans Park, Tallaght, Dub 24**

Infiltration Rate

Test Hole Dimensions:	
Length [m]	0.80
Width [m]	0.60
Depth [m]	1.20
Drop Time [min]	2160

V_{p75-25} = 0.8 x 0.6 x (0.9 - 0.3) = 0.288 m^3

A_{p50} = (0.8 x 0.6 x 2) + (0.6 x 0.6 x 2) + (0.8 x 0.6) = 2.16 m^2

$$f = \frac{0.288}{2.16 \times 2160 \times 60} = 1.03E\text{-}06 \text{ m/s}$$

Inflow and Outflow

Impermeable Area [m^2]	60.00
Rainfall Depth [mm]	37.95
Soakaway Length [m]	10.00
Soakaway Width [m]	1.00
Soakaway Depth [m]	1.20
Storm Duration [min]	60

Inflow = 60 x 0.03795 = 2.277 m^3

A_{s50} = (10 x 0.6 x 2) + (1 x 0.6 x 2) = 13.2 m^2

Outflow= 13.2 x 0.000001 x 3600 = 0.048889 m^3

Volume Required

Void Ratio [%]	30%

Storage = 2.277 - 0.048889 = 2.23 m^3

$$Volume = \frac{2.2281}{0.3} = 7.43 \text{ } m^3$$

Half Empty Time

$$T_{s50} = \frac{S \times 0.5}{A_{s50} \times f} = \frac{2.2281 \times 0.5}{13.2 \times 0.00000103 \times 3600} = 22.78 \text{ hrs}$$

= 22 hrs 47 mins

BRE under test

BRE 365 TEST HOLE

Dims:	0.8 m L x 0.6 m W x 1.2 m D
Date:	29/11/2022
Client:	Mary Dalton
Location:	146 St Maelruans Park, Tallaght, Dub 24

Met Eireann

Return Period Rainfall Depths for sliding Durations

Irish Grid: Easting: 313727, Northing: 225509,

	Interval		Years												
DURATION	6months,	1year,	2,	3,	4,	5,	10,	20,	30,	50,	75,	100,	150,	200,	250,	500,
5 mins	2.7,	4.0,	4.6,	5.7,	6.4,	7.0,	8.9,	11.1,	12.5,	14.6,	16.5,	18.0,	20.3,	22.1,	23.6,	N/A ,
10 mins	3.8,	5.5,	6.5,	7.9,	8.9,	9.7,	12.4,	15.4,	17.5,	20.4,	23.0,	25.1,	28.3,	30.8,	32.9,	N/A ,
15 mins	4.4,	6.5,	7.6,	9.3,	10.5,	11.5,	14.5,	18.1,	20.5,	24.0,	27.1,	29.5,	33.3,	36.2,	38.7,	N/A ,
30 mins	5.9,	8.5,	10.0,	12.2,	13.7,	14.9,	18.8,	23.3,	26.4,	30.7,	34.6,	37.6,	42.3,	46.0,	49.1,	N/A ,
1 hours	7.7,	11.2,	13.0,	15.9,	17.8,	19.3,	24.3,	30.0,	33.9,	39.3,	44.2,	48.0,	53.9,	58.5,	62.3,	N/A ,
2 hours	10.2,	14.6,	17.0,	20.7,	23.1,	25.1,	31.4,	38.7,	43.5,	50.3,	56.5,	61.2,	68.6,	74.4,	79.1,	N/A ,
3 hours	12.0,	17.2,	19.9,	24.1,	27.0,	29.2,	36.5,	44.8,	50.4,	58.2,	65.2,	70.6,	79.0,	85.6,	91.0,	N/A ,
4 hours	13.5,	19.2,	22.3,	26.9,	30.1,	32.5,	40.6,	49.8,	55.9,	64.5,	72.2,	78.1,	87.4,	94.6,	100.5,	N/A ,
6 hours	15.9,	22.5,	26.1,	31.4,	35.1,	37.9,	47.2,	57.7,	64.7,	74.6,	83.3,	90.1,	100.7,	108.8,	115.6,	N/A ,
9 hours	18.7,	26.4,	30.5,	36.7,	40.9,	44.2,	54.9,	67.0,	74.9,	86.2,	96.2,	104.0,	116.0,	125.3,	133.0,	N/A ,
12 hours	21.0,	29.5,	34.1,	41.0,	45.6,	49.2,	61.0,	74.4,	83.2,	95.6,	106.6,	115.1,	128.3,	138.5,	146.9,	N/A ,
18 hours	24.7,	34.6,	40.0,	47.9,	53.2,	57.4,	71.0,	86.3,	96.4,	110.5,	123.1,	132.8,	147.8,	159.4,	169.0,	N/A ,
24 hours	27.8,	38.8,	44.7,	53.5,	59.4,	64.0,	79.0,	95.8,	107.0,	122.5,	136.3,	147.0,	163.5,	176.2,	186.7,	223.6,
2 days	35.1,	47.7,	54.4,	64.2,	70.7,	75.8,	92.0,	110.1,	121.8,	138.1,	152.4,	163.4,	180.2,	193.1,	203.8,	240.7,
3 days	41.0,	55.0,	62.2,	72.9,	79.9,	85.3,	102.6,	121.7,	134.0,	151.0,	165.9,	177.3,	194.6,	207.8,	218.7,	256.2,
4 days	46.2,	61.3,	69.0,	80.4,	87.9,	93.6,	111.9,	131.8,	144.7,	162.3,	177.7,	189.4,	207.2,	220.8,	232.0,	270.2,
6 days	55.3,	72.3,	81.0,	93.5,	101.8,	108.0,	127.9,	149.4,	163.1,	182.0,	198.3,	210.6,	229.3,	243.6,	255.2,	294.9,
8 days	63.4,	82.0,	91.4,	105.0,	113.9,	120.6,	141.9,	164.7,	179.2,	199.1,	216.1,	229.1,	248.6,	263.4,	275.5,	316.5,
10 days	70.9,	90.9,	101.0,	115.5,	124.9,	132.1,	154.5,	178.6,	193.8,	214.5,	232.3,	245.7,	266.0,	281.3,	293.8,	336.0,
12 days	77.8,	99.2,	109.9,	125.2,	135.2,	142.7,	166.2,	191.3,	207.2,	228.7,	247.2,	261.1,	282.0,	297.8,	310.6,	354.0,
16 days	90.8,	114.5,	126.3,	143.1,	154.0,	162.2,	187.7,	214.7,	231.7,	254.6,	274.2,	289.0,	311.1,	327.7,	341.2,	386.7,
20 days	102.9,	128.7,	141.5,	159.6,	171.2,	180.0,	207.2,	235.9,	253.9,	278.1,	298.8,	314.2,	337.4,	354.8,	368.8,	416.2,
25 days	117.1,	145.2,	159.1,	178.6,	191.2,	200.6,	229.8,	260.4,	279.5,	305.1,	326.9,	343.2,	367.5,	385.7,	400.5,	449.9,

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

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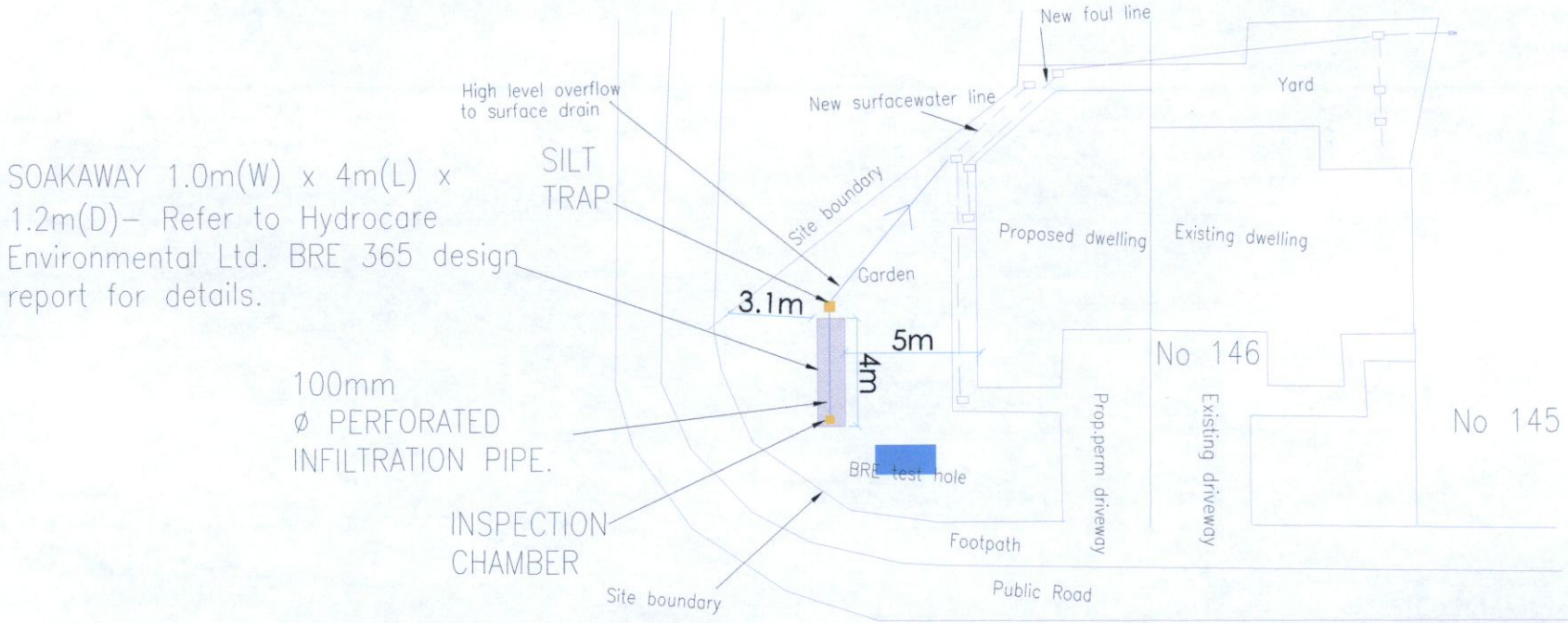
NOT CONSTRUCTION ISSUE



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SOAKAWAY LAYOUT

MARY DALTON
146 ST MAELRUANS PARK
DUB 24

SCALE 1:250 DATE: 11/01/2023

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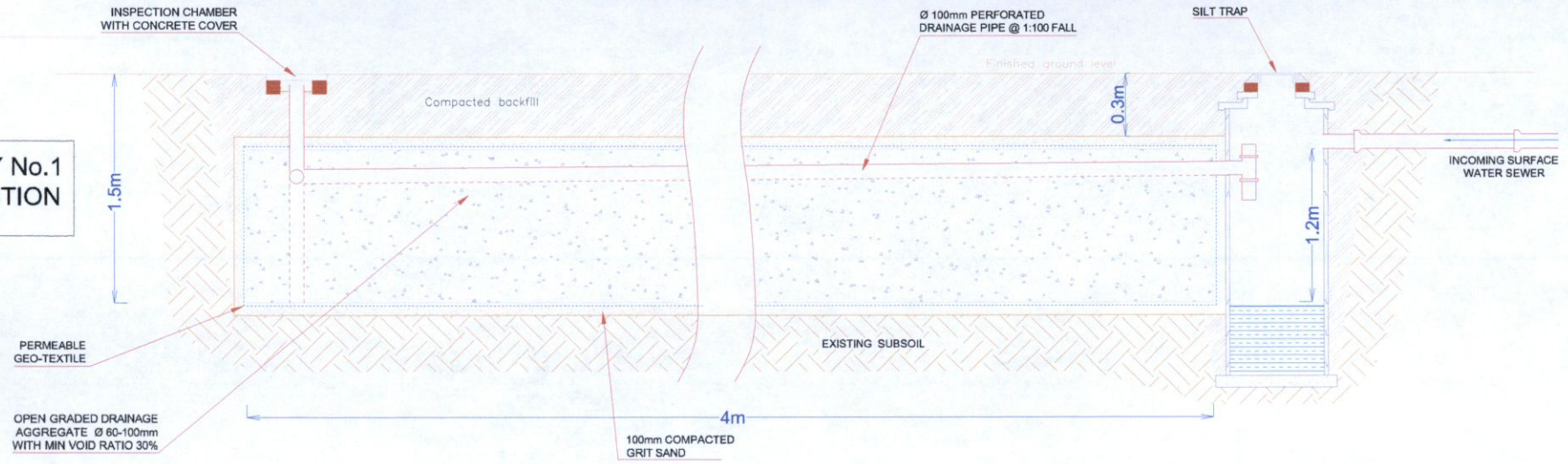
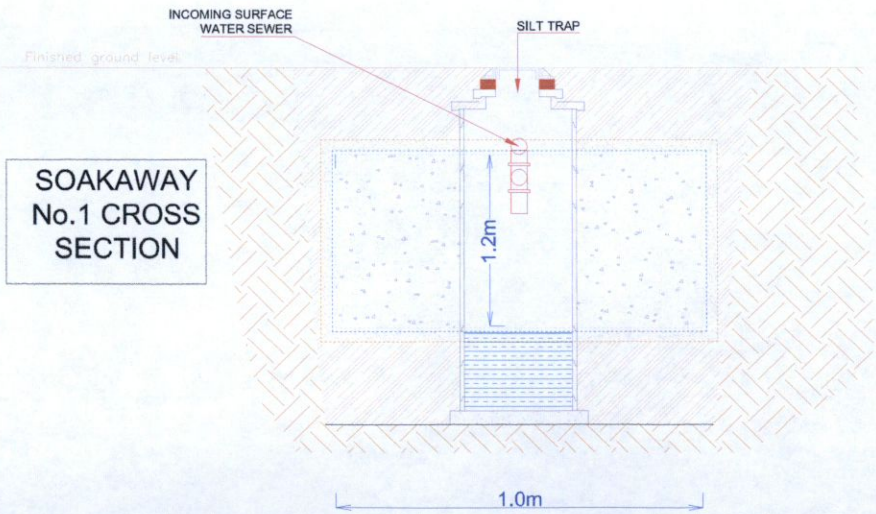
NOT CONSTRUCTION ISSUE

SOAKAWAY No.1 LONG SECTION



SOAKAWAY No.1 CROSS SECTION



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SOAKAWAY SECTION

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