



Coughlan Consulting Engineering

Consulting Structural & Civil Engineering
25 Kiltipper Avenue, Aylesbury, Tallaght, D4 F2NR
T 086 3872337 / E robertcoughlan@ymail.com

22047

17th August 2022

SD21B/0641 - 32, St. Patrick's Cottages, Rathfarnham, Dublin 14 – Conditions 4 and 5

Item 4. There are no soil percolation test results, design calculations or dimensions submitted for the proposed soakaway. The applicant is requested to submit a report showing site specific soil percolation test results and design calculations for the proposed soakaway in accordance with BRE Digest 365 – Soakaway Design.

Item 5. The applicant is requested to submit a revised drawing showing plan & cross-sectional views, dimensions, and location of proposed soakaway. Any proposed soakaway shall be located fully within the curtilage of the property and shall be:

- (i) At least 5m from any building, public sewer, road boundary or structure.
- (ii) Generally, not within 3m of the boundary of the adjoining property.
- (iii) Not in such a position that the ground below foundations is likely to be adversely affected.
- (iv) 10m from any sewage treatment percolation area and from any watercourse / floodplain.
- (v) Where practical soakaways must include an overflow connection to the surface water drainage network.

Response:

Coughlan Consulting Engineering were appointed by Gail and Ronan Carey of 32, St. Patrick's Cottages, Rathfarnham, Dublin 14 to prepare an engineering response to Items 4 and 5 above.

Coughlan Consulting Engineering instructed an infiltration test on site to determine the required size for the soakaway test. The test hole excavated was 1mx1m in area and 1m deep.

The hardstanding area considered in the soakaway calculation caters for the flat roofs on ground and 1st floor and is circa 45m². Note the existing single storey flat roof currently connects to the private drainage system and by taking this rainwater from this network and into the soakpit, improves the available capacity of the existing drainage system.

Item 4 - Please see Soakaway Calculations in Appendix A.

Item 5 – Please see marked up site plan of extent of soakaway, together with through section of soakaway.

For and on behalf of: Coughlan Consulting Engineering
25 Kiltipper Avenue,
Aylesbury,
Tallaght,
Dublin 24.

Signed:

Robert Coughlan

Name: Robert Coughlan
Qualifications: BE, CEng, MIEI, MISTuctE, BER Assessor.
Professional Body/Membership No. MIEI No.: 053927

Appendix A : Soakaway Calculations

	Project 22047 32 St Patricks Cottages				Job no. 22047	
	Calcs for Soakaway Deisgn				Start page no./Revision 1	
	Calcs by RC	Calcs date 17/08/2022	Checked by	Checked date	Approved by	Approved date

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 = 43.0 m²
Return period	Period = 30 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 = 19.0 mm
Increase of rainfall intensity due to global warming	p _{climate} = 10 %

Soakaway / infiltration trench details

Soakaway type	Rectangular
Minimum depth of pit (below incoming invert)	d = 949 mm
Width of pit	w = 2750 mm
Length of pit	l = 1500 mm
Percentage free volume	V _{free} = 30 %

Soil infiltration rate (BRE digest 365)

Length of trial pit	l _{trial} = 1000 mm
Width of trial pit	b _{trial} = 1000 mm
Depth of trial pit (below invert)	d _{trial} = 1000 mm
Free volume (if fill used)	V _{trial} = 100 %
75% depth of pit	d ₇₅ = (d _{trial} × 0.75) = 750.00 mm
50% depth of pit	d ₅₀ = (d _{trial} × 0.50) = 500.00 mm
25% depth of pit	d ₂₅ = (d _{trial} × 0.25) = 250.00 mm
Test 1 - time to fall from 75% depth to 25% depth	T1 = 180 min
Test 2 - time to fall from 75% depth to 25% depth	T2 = 190 min
Test 3 - time to fall from 75% depth to 25% depth	T3 = 180 min
Longest time to fall from 75% depth to 25% depth	t _{lg} = max(T1, T2, T3) = 190 min
Storage volume from 75% to 25% depth	V _{p75_25} = (l _{trial} × b _{trial} × (d ₇₅ - d ₂₅)) × V _{trial} = 0.50 m³
Internal surface area to 50% depth	a _{p50} = ((l _{trial} × b _{trial}) + (l _{trial} + b _{trial}) × 2 × d ₅₀) = 3.00 m²
Surface area of soakaway to 50% storage depth	A _{s50} = 2 × (l _{trial} + b _{trial}) × d _{trial} / 2 = 2.000 m²
Soil infiltration rate	f = V _{p75_25} / (a _{p50} × t _{lg}) = 14.6 × 10⁻⁶ m/s
Wetted area of pit 50% full	a _{s50} = l × d + w × d = 4033261 mm²

Table equations

Inflow (cl.3.3.1)	I = M30 × 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	30 year rainfall, M30 (mm)	Inflow (m ³)	Outflow (m ³)	Storage required (m ³)
5	0.36;	7.5;	1.47;	11.0;	0.47;	0.02;	0.46
10	0.51;	10.7;	1.49;	15.9;	0.68;	0.04;	0.65
15	0.62;	13.0;	1.49;	19.3;	0.83;	0.05;	0.78
30	0.79;	16.5;	1.49;	24.6;	1.06;	0.11;	0.95

		Project 22047 32 St Patricks Cottages			Job no. 22047	
		Calcs for Soakaway Deisgn			Start page no./Revision 2	
		Calcs by RC	Calcs date 17/08/2022	Checked by	Checked date	Approved by Approved date

Duration, D (min)	Growth factor Z1	M5 rainfalls (mm)	Growth factor Z2	30 year rainfall, M30 (mm)	Inflow (m³)	Outflow (m³)	Storage required (m³)
60	1.00;	20.9;	1.47;	30.7;	1.32;	0.21;	1.11
120	1.22;	25.5;	1.46;	37.2;	1.60;	0.42;	1.17
240	1.48;	30.9;	1.44;	44.6;	1.92;	0.85;	1.07
360	1.67;	34.9;	1.43;	49.9;	2.14;	1.27;	0.87
600	1.90;	39.7;	1.41;	56.2;	2.41;	2.12;	0.29
1440	2.42;	50.6;	1.37;	69.4;	2.98;	5.09;	0.00

Required storage volume

$$S_{req} = 1.17 \text{ m}^3$$

Soakaway storage volume

$$S_{act} = l \times d \times w \times V_{free} = 1.17 \text{ m}^3$$

PASS - Soakaway storage volume

Time for emptying soakaway to half volume

$$t_{s50} = S_{req} \times 0.5 / (a_{s50} \times f) = 2\text{hr } 45\text{min } 22\text{s}$$

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

Appendix B : Soakaway Drawings

SERVICE LANEWA

CCE
32 ST PATRICKS COTTAGES
SK01 SOAKAWAY DETAILS

■ DENOTES NEW AJ

— DENOTES NEW SW LINES

SOAKPIT TO BE MINIMUM 5M FROM
REAR OF DWELLING

SOAKPIT TO BE MINIMUM 3M FROM
BOUNDARY WALLS

+00.035
x

15138

14225

+07.049
x

5300

NEW 2750X1500X1000MM DEEP SOAKPIT

site

1100

2000

CCE
32 ST PATRICKS COTTAGES
TYPICAL SOAKAWAY DETAILS
NOT TO SCALE
SK02

