

Soakaway/water storage capacity design using BRE Digest 365 as reference

Enter figures in the pale blue boxes. The results are in the dark blue boxes. Final result in lilac box

Date: 09.06.2022

Project: 89 Quadring Road, Donington. Front soakaway.

$$\text{Soil Infiltration rate } (f) = \frac{V_{p75-25}}{a_{p50} \times t_{p75-25}}$$

V_{p75-25} is the effective storage volume of water in the trial pit between 75% & 25% effective depth

a_{p50} is the internal surface area of the trial pit up to 50% effective depth and including the base area

t_{p75-25} is the time for the water level to fall from 75% to 25% effective depth

Storage volume of water in the trial pit between 75% & 25% effective depth		
Trial Pit Dimensions	L	0.3 m
	W	0.3 m
Effective storage depth	d	0.3 m
V_{p75-25}		0.01 m ³

Internal surface area of the trial pit up to 50% effective depth and including the base area		
Soakage Trial Pit Dimensions	L	0.3 m
	W	0.3 m
Effective storage depth	d	0.3 m
a_{p50}		0.27 m ²

Time in minutes for outflow between 75% & 25% effective depth		
t_{p75-25}		39 minutes

From test, infiltration rate (f) 0.000021

Area to be drained (m²) (A) 63 m²

Calculating design rainfall (R)

r value (Peterborough = 0.40)

Free volume (% voids)

	0.4	(note z1 values change with r value)
V_f	95	%

Soakaway size

	l	2	m
	w	1	m
Depth below discharge level (effective depth)	d	0.8	m
Area of sides of whole soakaway		4.8	m ²
50% Internal surface area (excluding base)	(a_{s50})	2.4	m ²
Storage Volume of soakaway (l x w x d x V_f)		1.52	m ³ (must equal or exceed S)

Duration "D"	Rainfall (mm)	r value	Z1 value	M5 Design rainfall (mm)	Z2 value	M100 Design rainfall (mm) (M5 x Z2) R	Inflow (I) (m ³) (A x R)	Outflow (O) (m ³) (a_{s50}) x f x D	Storage (S) (m ³) (I - O)
10	20	0.4	0.52	10.40	1.22	12.7	0.799	0.03	0.77
15	20	0.4	0.63	12.60	1.23	15.5	0.976	0.05	0.93
30	20	0.4	0.80	16.00	1.24	19.8	1.250	0.09	1.16
60	20	0.4	1.00	20.00	1.24	24.8	1.562	0.18	1.38
120	20	0.4	1.21	24.20	1.24	30.0	1.891	0.37	1.52
240	20	0.4	1.46	29.20	1.23	35.9	2.263	0.74	1.52
360	20	0.4	1.62	32.40	1.22	39.5	2.490	1.11	1.38
600	20	0.4	1.82	36.40	1.21	44.0	2.775	1.85	0.93
1440	20	0.4	2.28	45.60	1.19	54.3	3.419	4.43	-1.01

Check on time of emptying half storage volume (should be less than 24 hours)

$$(t_{s50}) = (S \times 0.5) / (a_{s50} \times f)$$

= 4.1 hours to empty half storage volume