

Project Tyrolean Lodge, Yapton				Job no. 21533	
Calcs for Soakaway				Start page no./Revision 1	
Calcs by MAW	Calcs date 16/04/2026	Checked by	Checked date	Approved by	Approved date

SOAKAWAY DESIGN

In accordance with BRE Digest 365 - Soakaway design

Tedds calculation version 2.0.01

Design rainfall intensity

Location of catchment area	Bournemouth
Impermeable area drained to the system	A = 79.0 m ²
Return period	Period = 30 yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = 0.350
5-year return period rainfall of 60 minutes duration	M5_60min = 19.0 mm
Increase of rainfall intensity due to global warming	p _{climate} = 30 %

Soakaway / infiltration trench details

Soakaway type	Rectangular
Minimum depth of pit (below incoming invert)	d = 1000 mm
Width of pit	w = 1000 mm
Length of pit	l = 3150 mm
Percentage free volume	V _{free} = 95 %

Soil infiltration rate (BRE digest 365)

Length of trial pit	l _{trial} = 1050 mm
Width of trial pit	b _{trial} = 525 mm
Depth of trial pit (below invert)	d _{trial} = 500 mm
Free volume (if fill used)	V _{trial} = 100 %
75% depth of pit	d ₇₅ = (d _{trial} × 0.75) = 375.00 mm
50% depth of pit	d ₅₀ = (d _{trial} × 0.50) = 250.00 mm
25% depth of pit	d ₂₅ = (d _{trial} × 0.25) = 125.00 mm
Test 1 - time to fall from 75% depth to 25% depth	T1 = 32 min
Test 2 - time to fall from 75% depth to 25% depth	T2 = 51 min
Test 3 - time to fall from 75% depth to 25% depth	T3 = 74 min
Longest time to fall from 75% depth to 25% depth	t _{lg} = max(T1, T2, T3) = 74 min
Storage volume from 75% to 25% depth	V _{p75_25} = (l _{trial} × b _{trial} × (d ₇₅ - d ₂₅)) × V _{trial} = 0.14 m ³
Internal surface area to 50% depth	a _{p50} = ((l _{trial} × b _{trial}) + (l _{trial} + b _{trial}) × 2 × d ₅₀) = 1.34 m ²
Surface area of soakaway to 50% storage depth	A _{s50} = 2 × (l _{trial} + b _{trial}) × d _{trial} / 2 = 0.788 m ²
Soil infiltration rate	f = V _{p75_25} / (a _{p50} × t _{lg}) = 23.2 × 10⁻⁶ m/s
Wetted area of pit 50% full	a _{s50} = l × d + w × d = 4150000 mm ²

Table equations

Inflow	I = M30 × A
Outflow	O = a _{s50} × f × D
Storage	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	8.8	1.47	13.0	1.03	0.03	1.00
10	0.51	12.5	1.51	18.9	1.49	0.06	1.43
15	0.62	15.2	1.53	23.3	1.84	0.09	1.75

Project Tyrolean Lodge, Yapton				Job no. 21533	
Calcs for Soakaway				Start page no./Revision 2	
Calcs by MAW	Calcs date 16/04/2026	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 (m ³)	Outflow (m ³)	Storage required (m ³)
30	0.79	19.4	1.54	30.0	2.37	0.17	2.19
60	1.00	24.7	1.53	37.9	2.99	0.35	2.65
120	1.22	30.2	1.51	45.7	3.61	0.69	2.92
240	1.50	37.0	1.48	54.7	4.32	1.39	2.94
360	1.69	41.7	1.46	60.9	4.81	2.08	2.73
600	1.95	48.1	1.43	68.7	5.43	3.46	1.96
1440	2.48	61.3	1.39	84.9	6.70	8.31	0.00

Required storage volume

$$S_{\text{req}} = 2.94 \text{ m}^3$$

Soakaway storage volume

$$S_{\text{act}} = l \times d \times w \times V_{\text{free}} = 2.99 \text{ m}^3$$

PASS - Soakaway storage volume

Time for emptying soakaway to half volume

$$t_{s50} = S_{\text{req}} \times 0.5 / (a_{s50} \times f) = 4\text{hr } 14\text{min } 34\text{s}$$

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