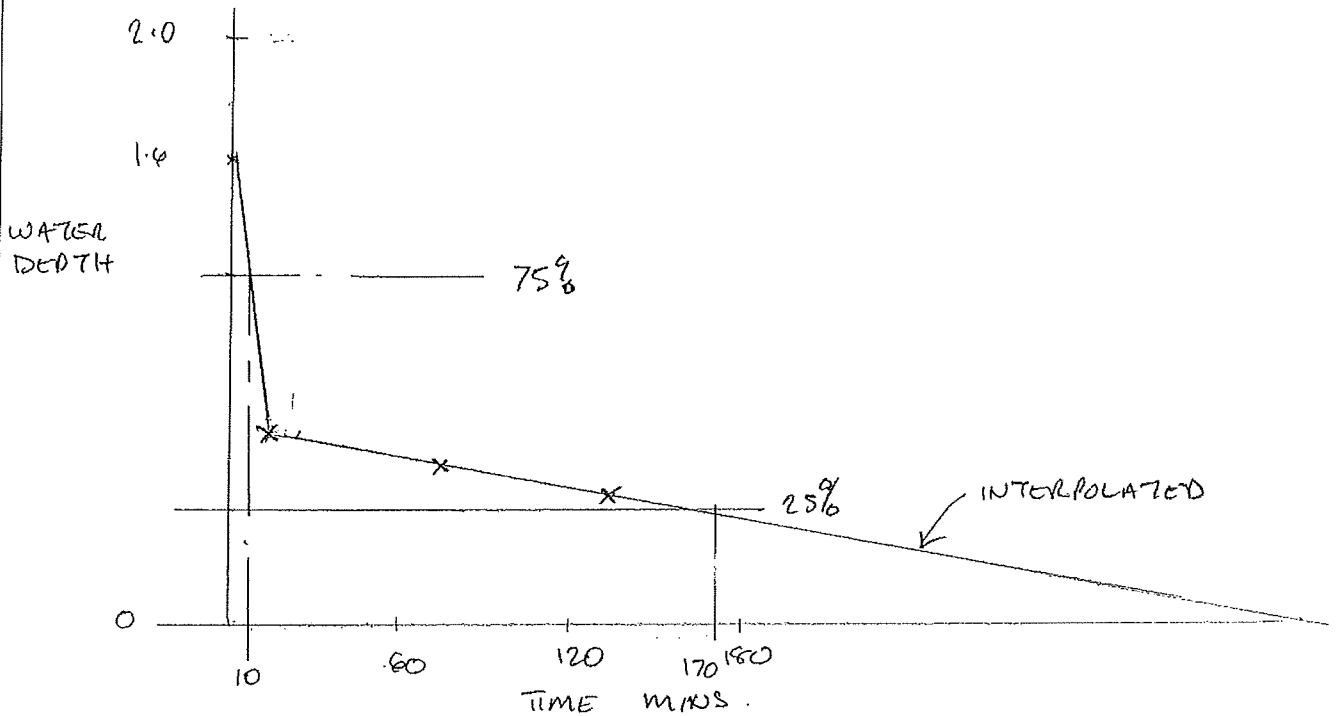


CALCULATIONS

Job Title	DEANS YARD FONTWELL	Job No.	AAL057	Sht. No.	81
Element	SOAKAWAYS		Date NOV 17	Checked	Date



SOAKAGE TEST RESULT.

SEE 'TEODS' COMPUTER ANALYSIS.

SOIL INFILTRATION RATE = 2.5×10^{-5}

PROVIDE 4.0m x 2.0m x 0.8m DEEP (BELOW INVERT OF
INCOMING DRAIN). CELLULAR SOAKAWAY
WAVIN AQUACELL OR SIMILAR.

 ARCH ASSOCIATES CONSULTING CIVIL AND STRUCTURAL ENGINEERS	Project Deans Yard, Orchard Way, Fontwell			Job no. AAL057	
	Calcs for Soakaways			Start page no./Revision 1	
	Calcs by AWR	Calcs date 10/05/2018	Checked by	Checked date	Approved by Approved date

SOAKAWAY DESIGN

In accordance with BRE Digest 365 - Soakaway design

Tedds calculation version 2.0.02

Design rainfall intensity

Location of catchment area	Brighton
Impermeable area drained to the system	A = 96.0 m ²
Return period	Period = 100 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 = 20.0 mm
Increase of rainfall intensity due to global warming	p _{climate} = 40 %

Soakaway / infiltration trench details

Soakaway type	Rectangular
Minimum depth of pit (below incoming invert)	d = 800 mm
Width of pit	w = 2000 mm
Length of pit	l = 3824 mm
Percentage free volume	V _{free} = 95 %

Soil infiltration rate (BRE digest 365)

Length of trial pit	l _{trial} = 1600 mm
Width of trial pit	b _{trial} = 1300 mm
Depth of trial pit (below invert)	d _{trial} = 1600 mm
Free volume (if fill used)	V _{trial} = 100 %
75% depth of pit	d ₇₅ = (d _{trial} × 0.75) = 1200.00 mm
50% depth of pit	d ₅₀ = (d _{trial} × 0.50) = 800.00 mm
25% depth of pit	d ₂₅ = (d _{trial} × 0.25) = 400.00 mm
Test 1 - time to fall from 75% depth to 25% depth	T1 = 160 min
Test 2 - time to fall from 75% depth to 25% depth	T2 = 160 min
Test 3 - time to fall from 75% depth to 25% depth	T3 = 160 min
Longest time to fall from 75% depth to 25% depth	t _{lg} = max(T1, T2, T3) = 160 min
Storage volume from 75% to 25% depth	V _{p75_25} = (l _{trial} × b _{trial} × (d ₇₅ - d ₂₅)) × V _{trial} = 1.66 m ³
Internal surface area to 50% depth	a _{p50} = ((l _{trial} × b _{trial}) + (l _{trial} + b _{trial}) × 2 × d ₅₀) = 6.72 m ²
Surface area of soakaway to 50% storage depth	A _{s50} = 2 × (l _{trial} + b _{trial}) × d _{trial} / 2 = 4.640 m ²
Soil infiltration rate	f = V _{p75_25} / (a _{p50} × t _{lg}) = 25.8 × 10 ⁻⁶ m/s
Wetted area of pit 50% full	a _{s50} = l × d + w × d = 4658822 mm ²

Table equations

Inflow	I = M100 × A
Outflow	O = a _{s50} × f × D
Storage	S = I - O

Duration, D (min)	Growth factor Z1	M5 rainfalls (mm)	Growth factor Z2	100 year rainfall, M100 (mm)	Inflow (m ³)	Outflow (m ³)	Storage required (m ³)
5	0.36	10.0	1.91	19.1	1.83	0.04	1.79
10	0.51	14.2	1.98	28.0	2.69	0.07	2.62
15	0.62	17.3	2.01	34.7	3.33	0.11	3.22

 ARCH ASSOCIATES CONSULTING CIVIL AND STRUCTURAL ENGINEERS	Project				Job no.	
	Deans Yard, Orchard Way, Fontwell				AAL057	
	Calcs for				Start page no./Revision	
Soakaways				2		
Calcs by	Calcs date	Checked by	Checked date	Approved by	Approved date	
AWR	10/05/2018					

Duration, D (min)	Growth factor Z1	M5 rainfalls (mm)	Growth factor Z2	100 year rainfall, M100 (mm)	Inflow (m ³)	Outflow (m ³)	Storage required (m ³)
30	0.79	22.0	2.02	44.5	4.28	0.22	4.06
60	1.00	28.0	1.99	55.6	5.34	0.43	4.91
120	1.22	34.3	1.94	66.3	6.37	0.87	5.50
240	1.50	41.9	1.87	78.6	7.54	1.73	5.81
360	1.69	47.3	1.83	86.7	8.32	2.60	5.72
600	1.95	54.5	1.78	97.0	9.31	4.33	4.98
1440	2.48	69.4	1.68	116.5	11.18	10.38	0.80

Required storage volume

$$S_{req} = 5.81 \text{ m}^3$$

Soakaway storage volume

$$S_{act} = l \times d \times w \times V_{free} = 5.81 \text{ m}^3$$

PASS - Soakaway storage volume

Time for emptying soakaway to half volume

$$t_{s50} = S_{req} \times 0.5 / (a_{s50} \times f) = 6\text{hr } 42\text{min } 55\text{s}$$

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