

MasterDrain  
SW 12.23



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Job No.		
Sheet no.		1
Date		
24/09/10		
By	Checked	Approved
IJ		

Project	
Title	Concrete ring soakaway calculations for BATH

**Data:-**

**Location hydrological data (FSR):-**

Location	= BATH	Grid reference	= ST7464
M5-60 (mm)	= 20.7	r	= 0.36
Soil index	= 0.40	SAAR (mm/yr)	= 800
WRAP	= 3	Area	= England and Wales

Soil classification for WRAP type 3

- i) Relatively impermeable soils in boulder and sedimentary clays, and in alluvium, especially in eastern England;
- ii) Permeable soils with shallow ground water in low-lying areas;
- iii) Mixed areas of permeable and impermeable soils, in approximately equal proportions.

**Design data:-**

Safety factor = 1.5 - No damage or inconvenience  
 Fill porosity = 0.45 - Clean stone (porosity = 0.4 - 0.5)  
 Equivalent porosity (n1) = 1.01

Ring diameter = 2400 mm

Pit dimensions= 3.0 x 3.0 metres

Area drained = 200 m<sup>2</sup>

Infiltration coefficient = 0.002 m/hr  
 Effective inf.coeff (q) = 0.0013333

Return period = 100 yrs

Climate change factor = 30%

**Calculations :-**

Concrete ring design:-

Perimeter of pit = (2 x Excavation Width)+(2 x Excavation Length)  
 Area of base = Excavation Width x Excavation Length  
 Temporary constant 'a'  
 = (Area of base / perimeter)-((AreaDrained x Rainfall depth /1000)/(Perimeter/Inf. coeff))  
 Temporary constant 'b' = (Perimeter/Inf. coeff) / (Area of base x porosity)  
 Hmax = a\*((EXP(-1 x b x Duration of storm))-1)

Note: The Hmax calculation is iterated to a maximum value of Hmax.

Note: Duration of storm in hours, Rainfall depth in mm/hr x Climate Change factor.

**Results :-**

Emptying time to 50% volume = 295:09 (hr:min)

**hMax (Depth) = 3.17 metres**

Time to maximum = 182:01 hr:min

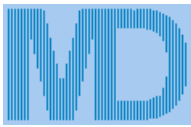
Rainfall at maximum = 0.98mm/hr

Width (m) = 3.0

Length (m) = 3.0

N.B. The rainfall rates are calculated using the location specific values listed above in accordance with the Wallingford procedure.

Formulae and methods from CIRIA 156.  
 Custom safety factor used in preference to CIRIA values.



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Soil structure :-

