



MasterDrain
HY 11.0

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Job No.	23010		
Sheet no.	1		
Date	31/10/23		
By	TDS	Checked	Reviewed

Project **Elmfield House, Petersfinger Road, Salisbury, SP5 3BZ**

Title **IoH 124 Runoff calcs for SALISBURY**

Hydrological Data:-

FSR Hydrology:-

Location = SALISBURY

M5-60 (mm) = 19.3

Soil runoff = 0.30

WRAP = 2

Hydrological area = 7

Grid reference = SU1429

r = 0.36

SAAR (mm/yr) = 840

Area = England & Wales

Hydrological zone = 8

Soil classification for WRAP type 2

i) Very permeable soils with shallow ground water;

ii) Permeable soils over rock or fragipan, commonly on slopes in western Britain associated with smaller areas of less permeable wet soils; (fragipan - a natural subsurface horizon having a higher bulk density than the solum above. Seemingly cemented when dry but showing moderate to weak brittleness when moist. The layer is low in organic matter, mottled and slowly or very slowly permeable to water. It is found in profiles of either cultivated or virgin soils but not in calcareous material).

iii) Moderately permeable soils, some with slowly permeable subsoils.

Design data:-

Area = 0.010496 Km² - 1.05 Ha - 10496 m²

Calculation method:-

Runoff is calculated from:-

$$Q_{\text{BAR(rural)}} = 0.00108 \text{ AREA}^{0.89} \cdot \text{SAAR}^{1.17} \cdot \text{SOIL}^{2.17}$$

where

AREA = Site area in Km²

SAAR = Standard Average Annual Rainfall (mm/yr)

SOIL = Soil value derived from Winter Rainfall Acceptance Potential

$Q_{\text{BAR(rural)}}$ = Runoff (cumecs)

$Q_{\text{BAR(rural)}}$ is then multiplied by a growth factor - GC(T) - for different storm return periods derived from EA publication W5-074/A.

Calculated data:-

For areas less than 50Ha, a modified calculation which multiplies the 50Ha runoff value by the ratio of the site area to 50Ha is used
Reducing factor used for these calculations is 0.021

Mean Annual Peak Flow $Q_{\text{BAR(rural)}}$ = 2.37 l/s



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Values for $Q_{\text{BAR(rural)}}$

Ret. per.	m ³ /hr	l/s	l/s/ha	Ret. per.	m ³ /hr	l/s	l/s/ha
1yr	7.245	2.013	1.917	100yr+20%	32.219	8.950	8.527
2yr	7.501	2.084	1.985	100yr+30%	34.904	9.696	9.237
5yr	10.910	3.031	2.887	100yr+40%	37.589	10.441	9.948
10yr	13.808	3.836	3.654	200yr	31.537	8.760	8.346
30yr	19.008	5.280	5.030	200yr + 30%	40.999	11.388	10.850
50yr	22.332	6.203	5.910	500yr	38.271	10.631	10.128
100yr	26.849	7.458	7.106	1000yr	43.982	12.217	11.640

Growth factors -

1yr	2yr	5yr	10yr	30yr	50yr	100yr	200yr	500yr	1000yr
0.85	0.88	1.28	1.62	2.23	2.62	3.15	3.70	4.49	5.16

The above is based on the Institute of Hydrology Report 124
to which you are referred for further details (see Sect 7).
Note that the 200 and above year growth curves were taken from W5-074.