



MasterDrain
HY 9.5

REDES www.redes.co.uk	Civil & Infrastructure Engineers Unit 4, Bridge House, Bridge Business Park, Ash Road South, Wrexham LL13 9UG Tel: 01978 661335 e-mail mail@redes.co.uk		Job No. RED-ERL-001
			Sheet no. 1
			Date 20/10/20
Project Big Green Farm Penley	By JGW	Checked KB	Reviewed
Title IoH 124 Greenfield Runoff calcs for Big Green Farm = Penley			

Hydrological Data:-

FSR Hydrology:-

Location = WREXHAM	Grid reference = SJ3349
M5-60 (mm) = 18	r = 0.32
Soil runoff = 0.45	SAAR (mm/yr) = 800
WRAP = 4	Area = England & Wales
Hydrological area = 9	Hydrological zone = 4

Soil classification for WRAP type 4

Clayey, or loamy over clayey soils with an impermeable layer at shallow depth.

Design data:-

Area = 0.0038 Km² - 0.38 Ha - 3800 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 0.008

Mean Annual Peak Flow $Q_{\text{BAR(rural)}}$ = 1.95 l/s



MasterDrain
HY 9.5

REDES

www.redes.co.uk

Civil & Infrastructure Engineers
Unit 4, Bridge House, Bridge Business Park,
Ash Road South, Wrexham LL13 9UG
Tel: 01978 661335
e-mail mail@redes.co.uk

Job No.
RED-ERL-001

Sheet no.
2

Date
20/10/20

Project
Penley Housing Site

Title
loH 124 Runoff calcs for WREXHAM

By
KB

Checked

Reviewed

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

Ret. per. 1yr	m ³ /hr 5.972	1/s 1.659	1/s/ha 4.366	Ret. per. 100yr	m ³ /hr 15.317	1/s 4.255	1/s/ha 11.196
2yr	6.534	1.815	4.776	100yr+20%	18.380	5.106	13.436
5yr	8.572	2.381	6.266	100yr+30%	19.912	5.531	14.555
10yr	9.977	2.771	7.293	200yr	17.565	4.879	12.840
30yr	12.296	3.415	8.988	200yr + 30%	22.835	6.343	16.692
50yr	13.630	3.786	9.964	500yr	20.094	5.582	14.689
				1000yr	22.413	6.226	16.384

Growth factors -

1yr	2yr	5yr	10yr	30yr	50yr	100yr	200yr	500yr	1000yr
0.85	0.93	1.22	1.42	1.75	1.94	2.18	2.50	2.86	3.19

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.