

DUNSBURY WAT DRAINAGE

PROVIDE SUFFICIENT ATTENUATION TO ENSURE AN
RAINWATER FROM A 1 IN 30 YEAR EVENT IS STORED BELOW
GROUND.

$$\text{CATCHMENT AREA} = 4820 \text{ m}^2$$

ATTEN RESTRICTED TO S L/S

CALCULATE RAINFALL USING WINGFORD PROCEDURE

$$\text{INFLOW} = \text{CATCHMENT AREA} \times \text{RAINFALL}$$

DURATION (MINS)	RAINFALL (mm)	INFLOW (m ³)	ATTEN (m ³)	STORAGE (m ³)
5	9.8	47.2	1.5	46
10	14.3	68.9	3.0	66
15	17.6	84.8	4.5	80
30	22.8	110	9.0	101
60	29.3	141	18.0	123
120	35.7	172	36.0	136
240	43.2	208	72.0	136
360	48.3	233	108	125
600	54.8	264	180	84
1440	67.5	325	432	—

∴ PEAK FLOW OCCURS AT 120-240 MINS

$$\text{ATTENUATION REQUIRED} = \underline{\underline{136 \text{ m}^3}}$$

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RJWatkinson Consulting Civil and Structural Engineers 12 Elm Road, Havant Hampshire GU14 7JG Tel: 01494 471144 Fax: 01494 471145 Email: enquiries@rjwatkinson.co.uk www.rjwatkinson.co.uk	Project Kingsclere Avenue, Havant			Job no. 20496	
	Calcs for Surface Water Drainage - 1 in 30 Yr			Start page no./Revision 1	
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DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.00

Design rainfall intensity

Location of catchment area	Bournemouth
Storm duration	D = 5 min
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} = 0 %
Factor Z1 (Wallingford procedure)	Z1 = 0.36
Rainfall for 5min storm with 5 year return period	M5_5min _i = Z1 × M5_60min = 6.8 mm
Factor Z2 (Wallingford procedure)	Z2 = 1.45
Rainfall for 5min storm with 30 year return period	M30_5min = Z2 × M5_5min _i = 9.8 mm
Design rainfall intensity	I _{max} = M30_5min / D = 117.8 mm/hr

Maximum surface water runoff

Catchment area	A _{catch} = 4820 m ²
Percentage of area that is impermeable	p = 100 %
Maximum surface water runoff	Q _{max} = A _{catch} × p × I _{max} = 157.8 l/s

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DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.00

Design rainfall intensity

Location of catchment area	Bournemouth
Storm duration	D = 10 min
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} = 0 %
Factor Z1 (Wallingford procedure)	Z1 = 0.51
Rainfall for 10min storm with 5 year return period	M5_10min _i = Z1 × M5_60min = 9.6 mm
Factor Z2 (Wallingford procedure)	Z2 = 1.49
Rainfall for 10min storm with 30 year return period	M30_10min = Z2 × M5_10min _i = 14.3 mm
Design rainfall intensity	I _{max} = M30_10min / D = 85.8 mm/hr

Maximum surface water runoff

Catchment area	A _{catch} = 4820 m ²
Percentage of area that is impermeable	p = 100 %
Maximum surface water runoff	Q _{max} = A _{catch} × p × I _{max} = 114.9 l/s

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DESIGN RAINFALL

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Design rainfall intensity

Location of catchment area	Bournemouth
Storm duration	D = 15 min
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} = 0 %
Factor Z1 (Wallingford procedure)	Z1 = 0.62
Rainfall for 15min storm with 5 year return period	M5_15min _i = Z1 × M5_60min = 11.7 mm
Factor Z2 (Wallingford procedure)	Z2 = 1.50
Rainfall for 15min storm with 30 year return period	M30_15min = Z2 × M5_15min _i = 17.6 mm
Design rainfall intensity	I _{max} = M30_15min / D = 70.4 mm/hr

Maximum surface water runoff

Catchment area	A _{catch} = 4820 m ²
Percentage of area that is impermeable	p = 100 %
Maximum surface water runoff	Q _{max} = A _{catch} × p × I _{max} = 94.3 l/s

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DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.00

Design rainfall intensity

Location of catchment area	Bournemouth
Storm duration	D = 30 min
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} = 0 %
Factor Z1 (Wallingford procedure)	Z1 = 0.79
Rainfall for 30min storm with 5 year return period	M5_30min _i = Z1 × M5_60min = 14.9 mm
Factor Z2 (Wallingford procedure)	Z2 = 1.53
Rainfall for 30min storm with 30 year return period	M30_30min = Z2 × M5_30min _i = 22.8 mm
Design rainfall intensity	I _{max} = M30_30min / D = 45.6 mm/hr

Maximum surface water runoff

Catchment area	A _{catch} = 4820 m ²
Percentage of area that is impermeable	p = 100 %
Maximum surface water runoff	Q _{max} = A _{catch} × p × I _{max} = 61.1 l/s

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DESIGN RAINFALL

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Design rainfall intensity

Location of catchment area	Bournemouth
Storm duration	D = 1 hr
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} = 0 %
Factor Z1 (Wallingford procedure)	Z1 = 1.00
Rainfall for 1hr storm with 5 year return period	M5_1hr _i = Z1 × M5_60min = 19.0 mm
Factor Z2 (Wallingford procedure)	Z2 = 1.54
Rainfall for 1hr storm with 30 year return period	M30_1hr = Z2 × M5_1hr _i = 29.3 mm
Design rainfall intensity	I _{max} = M30_1hr / D = 29.3 mm/hr

Maximum surface water runoff

Catchment area	A _{catch} = 4820 m ²
Percentage of area that is impermeable	p = 100 %
Maximum surface water runoff	Q _{max} = A _{catch} × p × I _{max} = 39.2 l/s

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Design rainfall intensity

Location of catchment area	Bournemouth
Storm duration	D = 2 hr
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} = 0 %
Factor Z1 (Wallingford procedure)	Z1 = 1.22
Rainfall for 2hr storm with 5 year return period	M5_2hr _i = Z1 × M5_60min = 23.2 mm
Factor Z2 (Wallingford procedure)	Z2 = 1.54
Rainfall for 2hr storm with 30 year return period	M30_2hr = Z2 × M5_2hr _i = 35.7 mm
Design rainfall intensity	I _{max} = M30_2hr / D = 17.9 mm/hr

Maximum surface water runoff

Catchment area	A _{catch} = 4820 m ²
Percentage of area that is impermeable	p = 100 %
Maximum surface water runoff	Q _{max} = A _{catch} × p × I _{max} = 23.9 l/s

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Design rainfall intensity

Location of catchment area	Bournemouth
Storm duration	D = 4 hr
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} = 0 %
Factor Z1 (Wallingford procedure)	Z1 = 1.50
Rainfall for 4hr storm with 5 year return period	M5_4hr _r = Z1 × M5_60min = 28.4 mm
Factor Z2 (Wallingford procedure)	Z2 = 1.52
Rainfall for 4hr storm with 30 year return period	M30_4hr = Z2 × M5_4hr _r = 43.2 mm
Design rainfall intensity	I _{max} = M30_4hr / D = 10.8 mm/hr

Maximum surface water runoff

Catchment area	A _{catch} = 4820 m ²
Percentage of area that is impermeable	p = 100 %
Maximum surface water runoff	Q _{max} = A _{catch} × p × I _{max} = 14.5 l/s

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Design rainfall intensity

Location of catchment area	Bournemouth
Storm duration	D = 6 hr
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} = 0 %
Factor Z1 (Wallingford procedure)	Z1 = 1.69
Rainfall for 6hr storm with 5 year return period	M5_6hr _r = Z1 × M5_60min = 32.1 mm
Factor Z2 (Wallingford procedure)	Z2 = 1.50
Rainfall for 6hr storm with 30 year return period	M30_6hr = Z2 × M5_6hr _r = 48.3 mm
Design rainfall intensity	I _{max} = M30_6hr / D = 8.0 mm/hr

Maximum surface water runoff

Catchment area	A _{catch} = 4820 m ²
Percentage of area that is impermeable	p = 100 %
Maximum surface water runoff	Q _{max} = A _{catch} × p × I _{max} = 10.8 l/s

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Design rainfall intensity

Location of catchment area	Bournemouth
Storm duration	D = 10 hr
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} = 0 %
Factor Z1 (Wallingford procedure)	Z1 = 1.95
Rainfall for 10hr storm with 5 year return period	M5_10hr _i = Z1 × M5_60min = 37.0 mm
Factor Z2 (Wallingford procedure)	Z2 = 1.48
Rainfall for 10hr storm with 30 year return period	M30_10hr = Z2 × M5_10hr _i = 54.8 mm
Design rainfall intensity	I _{max} = M30_10hr / D = 5.5 mm/hr

Maximum surface water runoff

Catchment area	A _{catch} = 4820 m ²
Percentage of area that is impermeable	p = 100 %
Maximum surface water runoff	Q _{max} = A _{catch} × p × I _{max} = 7.3 l/s

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DESIGN RAINFALL

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Design rainfall intensity

Location of catchment area	Bournemouth
Storm duration	D = 24 hr
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} = 0 %
Factor Z1 (Wallingford procedure)	Z1 = 2.48
Rainfall for 24hr storm with 5 year return period	M5_24hr _i = Z1 × M5_60min = 47.1 mm
Factor Z2 (Wallingford procedure)	Z2 = 1.43
Rainfall for 24hr storm with 30 year return period	M30_24hr = Z2 × M5_24hr _i = 67.5 mm
Design rainfall intensity	I _{max} = M30_24hr / D = 2.8 mm/hr

Maximum surface water runoff

Catchment area	A _{catch} = 4820 m ²
Percentage of area that is impermeable	p = 100 %
Maximum surface water runoff	Q _{max} = A _{catch} × p × I _{max} = 3.8 l/s

DESIGN FOR 1% 100 YEAR EVENT

USING RAINFALL CALCULATED BY WAINWRIGHT PROCEDURE,

DURATION (MINS)	RAINFALL (MM)	INFLOW (m ³)	OUTFLOW (m ³)	DIFFERENCE (m ³)
5	12.4	59.8	1.5	58
10	18.3	88.2	3.0	85
15	22.7	109	4.5	105
30	29.7	143	9.0	134
60	38.4	185	18.0	167
120	46.9	226	36.0	190
240	56.6	272	72.0	200
360	62.7	302	108	194
600	70.8	341	180	161
1440	86.4	416	432	—

 $\therefore$ PEAK FLOW OCCURS AT 240 MINS.

$$\text{STORAGE IN 300\phi \text{ PIPE TO STORAGE TANKS}} \\ = 0.15^2 \times \pi \times 42 = 3 \text{ m}^3$$

$$\text{STORAGE IN 225\phi \text{ PIPE}} \\ = 0.1125^2 \times \pi \times 62 = 2.5 \text{ m}^3$$

$$\text{STORAGE IN MANHOLES} \\ = 3 \text{ NO} \times 1.0 = 3.0 \text{ m}^3$$

$$\text{SURFACE PONDING TO SURROUNDING PARKING AREA} \\ = [(13 \times 12) + (7 \times 10)] \times 0.11/2 = 10 \text{ m}^3 \text{ SAY}$$

 $\therefore$ ATTENUATION REQUIRED

$$= 200 - 3 - 2.5 - 3.0 - 10 = \underline{\underline{182 \text{ m}^3}}$$

DUE TO SITE TOPOGRAPHY DEGRADE UNDERGROUND STORAGE TO RETAIN THE REQUIRED VOLUME TO AVOID POTENTIAL FOR SITE FLOODING.

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Design rainfall intensity

Location of catchment area	Bournemouth
Storm duration	D = 5 min
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 = 19.0 mm
Increase of rainfall intensity due to global warming	p _{climate} = 0 %
Factor Z1 (Wallingford procedure)	Z1 = 0.36
Rainfall for 5min storm with 5 year return period	M5_5min _i = Z1 × M5_60min = 6.8 mm
Factor Z2 (Wallingford procedure)	Z2 = 1.83
Rainfall for 5min storm with 100 year return period	M100_5min = Z2 × M5_5min _i = 12.4 mm
Design rainfall intensity	I _{max} = M100_5min / D = 149.0 mm/hr

Maximum surface water runoff

Catchment area	A _{catch} = 4820 m ²
Percentage of area that is impermeable	p = 100 %
Maximum surface water runoff	Q _{max} = A _{catch} × p × I _{max} = 199.5 l/s

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DESIGN RAINFALL

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Design rainfall intensity

Location of catchment area	Bournemouth
Storm duration	D = 10 min
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 = 19.0 mm
Increase of rainfall intensity due to global warming	p _{climate} = 0 %
Factor Z1 (Wallingford procedure)	Z1 = 0.51
Rainfall for 10min storm with 5 year return period	M5_10min _i = Z1 × M5_60min = 9.6 mm
Factor Z2 (Wallingford procedure)	Z2 = 1.90
Rainfall for 10min storm with 100 year return period	M100_10min = Z2 × M5_10min _i = 18.3 mm
Design rainfall intensity	I _{max} = M100_10min / D = 109.8 mm/hr

Maximum surface water runoff

Catchment area	A _{catch} = 4820 m ²
Percentage of area that is impermeable	p = 100 %
Maximum surface water runoff	Q _{max} = A _{catch} × p × I _{max} = 147.0 l/s

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DESIGN RAINFALL

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Design rainfall intensity

Location of catchment area	Bournemouth
Storm duration	D = 15 min
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 = 19.0 mm
Increase of rainfall intensity due to global warming	p _{climate} = 0 %
Factor Z1 (Wallingford procedure)	Z1 = 0.62
Rainfall for 15min storm with 5 year return period	M5_15min _i = Z1 × M5_60min = 11.7 mm
Factor Z2 (Wallingford procedure)	Z2 = 1.94
Rainfall for 15min storm with 100 year return period	M100_15min = Z2 × M5_15min _i = 22.7 mm
Design rainfall intensity	I _{max} = M100_15min / D = 90.8 mm/hr

Maximum surface water runoff

Catchment area	A _{catch} = 4820 m ²
Percentage of area that is impermeable	p = 100 %
Maximum surface water runoff	Q _{max} = A _{catch} × p × I _{max} = 121.6 l/s

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DESIGN RAINFALL

In accordance with the Wallingford Procedure

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Design rainfall intensity

Location of catchment area Bournemouth
 Storm duration D = **30** min
 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 = **19.0** mm
 Increase of rainfall intensity due to global warming p_{climate} = **0** %
 Factor Z1 (Wallingford procedure) Z1 = **0.79**
 Rainfall for 30min storm with 5 year return period M5_30min_i = Z1 × M5_60min = **14.9** mm
 Factor Z2 (Wallingford procedure) Z2 = **1.99**
 Rainfall for 30min storm with 100 year return period M100_30min = Z2 × M5_30min_i = **29.7** mm
 Design rainfall intensity I_{max} = M100_30min / D = **59.5** mm/hr

Maximum surface water runoff

Catchment area A_{catch} = **4820** m²
 Percentage of area that is impermeable p = **100** %
 Maximum surface water runoff Q_{max} = A_{catch} × p × I_{max} = **79.6** l/s

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In accordance with the Wallingford Procedure

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Design rainfall intensity

Location of catchment area	Bournemouth
Storm duration	D = 1 hr
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 = 19.0 mm
Increase of rainfall intensity due to global warming	p _{climate} = 0 %
Factor Z1 (Wallingford procedure)	Z1 = 1.00
Rainfall for 1hr storm with 5 year return period	M5_1hr _i = Z1 × M5_60min = 19.0 mm
Factor Z2 (Wallingford procedure)	Z2 = 2.02
Rainfall for 1hr storm with 100 year return period	M100_1hr = Z2 × M5_1hr _i = 38.4 mm
Design rainfall intensity	I _{max} = M100_1hr / D = 38.4 mm/hr

Maximum surface water runoff

Catchment area	A _{catch} = 4820 m ²
Percentage of area that is impermeable	p = 100 %
Maximum surface water runoff	Q _{max} = A _{catch} × p × I _{max} = 51.4 l/s

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Design rainfall intensity

Location of catchment area	Bournemouth
Storm duration	D = 2 hr
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 = 19.0 mm
Increase of rainfall intensity due to global warming	p _{climate} = 0 %
Factor Z1 (Wallingford procedure)	Z1 = 1.22
Rainfall for 2hr storm with 5 year return period	M5_2hr _r = Z1 × M5_60min = 23.2 mm
Factor Z2 (Wallingford procedure)	Z2 = 2.02
Rainfall for 2hr storm with 100 year return period	M100_2hr = Z2 × M5_2hr _r = 46.9 mm
Design rainfall intensity	I _{max} = M100_2hr / D = 23.4 mm/hr

Maximum surface water runoff

Catchment area	A _{catch} = 4820 m ²
Percentage of area that is impermeable	p = 100 %
Maximum surface water runoff	Q _{max} = A _{catch} × p × I _{max} = 31.4 l/s

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DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.00

Design rainfall intensity

Location of catchment area	Bournemouth
Storm duration	D = 4 hr
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 = 19.0 mm
Increase of rainfall intensity due to global warming	p _{climate} = 0 %
Factor Z1 (Wallingford procedure)	Z1 = 1.50
Rainfall for 4hr storm with 5 year return period	M5_4hr _i = Z1 × M5_60min = 28.4 mm
Factor Z2 (Wallingford procedure)	Z2 = 1.98
Rainfall for 4hr storm with 100 year return period	M100_4hr = Z2 × M5_4hr _i = 56.4 mm
Design rainfall intensity	I _{max} = M100_4hr / D = 14.1 mm/hr

Maximum surface water runoff

Catchment area	A _{catch} = 4820 m ²
Percentage of area that is impermeable	p = 100 %
Maximum surface water runoff	Q _{max} = A _{catch} × p × I _{max} = 18.9 l/s

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DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.00

Design rainfall intensity

Location of catchment area	Bournemouth
Storm duration	D = 6 hr
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 = 19.0 mm
Increase of rainfall intensity due to global warming	p _{climate} = 0 %
Factor Z1 (Wallingford procedure)	Z1 = 1.69
Rainfall for 6hr storm with 5 year return period	M5_6hr _r = Z1 × M5_60min = 32.1 mm
Factor Z2 (Wallingford procedure)	Z2 = 1.95
Rainfall for 6hr storm with 100 year return period	M100_6hr = Z2 × M5_6hr _r = 62.7 mm
Design rainfall intensity	I _{max} = M100_6hr / D = 10.5 mm/hr

Maximum surface water runoff

Catchment area	A _{catch} = 4820 m ²
Percentage of area that is impermeable	p = 100 %
Maximum surface water runoff	Q _{max} = A _{catch} × p × I _{max} = 14.0 l/s

 RJWatkinson Consulting Civil and Structural Engineers 11th Floor, 100 Broad Street Birmingham, B1 2HT Tel: 0121 633 1000 Fax: 0121 633 1001 Email: info@rjwatkinson.co.uk www.rjwatkinson.co.uk	Project			Job no.		
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DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.00

Design rainfall intensity

Location of catchment area	Bournemouth
Storm duration	D = 10 hr
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 = 19.0 mm
Increase of rainfall intensity due to global warming	p _{climate} = 0 %
Factor Z1 (Wallingford procedure)	Z1 = 1.95
Rainfall for 10hr storm with 5 year return period	M5_10hr _r = Z1 × M5_60min = 37.0 mm
Factor Z2 (Wallingford procedure)	Z2 = 1.91
Rainfall for 10hr storm with 100 year return period	M100_10hr = Z2 × M5_10hr _r = 70.8 mm
Design rainfall intensity	I _{max} = M100_10hr / D = 7.1 mm/hr

Maximum surface water runoff

Catchment area	A _{catch} = 4820 m ²
Percentage of area that is impermeable	p = 100 %
Maximum surface water runoff	Q _{max} = A _{catch} × p × I _{max} = 9.5 l/s

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DESIGN RAINFALL

In accordance with the Wallingford Procedure

Tedds calculation version 2.0.00

Design rainfall intensity

Location of catchment area	Bournemouth
Storm duration	D = 24 hr
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 = 19.0 mm
Increase of rainfall intensity due to global warming	p _{climate} = 0 %
Factor Z1 (Wallingford procedure)	Z1 = 2.48
Rainfall for 24hr storm with 5 year return period	M5_24hr _i = Z1 × M5_60min = 47.1 mm
Factor Z2 (Wallingford procedure)	Z2 = 1.83
Rainfall for 24hr storm with 100 year return period	M100_24hr = Z2 × M5_24hr _i = 86.4 mm
Design rainfall intensity	I _{max} = M100_24hr / D = 3.6 mm/hr

Maximum surface water runoff

Catchment area	A _{catch} = 4820 m ²
Percentage of area that is impermeable	p = 100 %
Maximum surface water runoff	Q _{max} = A _{catch} × p × I _{max} = 4.8 l/s