

Calculated by:	Hannah Buchanan
Site name:	Oakamoor Road
Site location:	Cheadle

This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance "Rainfall runoff management for developments", SC030219 (2013), the SuDS Manual C753 (Ciria, 2015) and the non-statutory standards for SuDS (Defra, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Site Details

Latitude:	52.99109° N
Longitude:	1.97449° W
Reference:	546713135
Date:	Aug 03 2023 15:30

Runoff estimation approach

FEH Statistical

Site characteristics

Total site area (ha):	1
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Methodology

Q _{MED} estimation method:	Calculate from BFI and SAAR
BFI and SPR method:	Specify BFI manually
HOST class:	N/A
BFI / BFIHOST:	0.474
Q _{MED} (l/s):	
Q _{BAR} / Q _{MED} factor:	1.12

Hydrological characteristics

	Default	Edited
SAAR (mm):	873	873
Hydrological region:	4	4
Growth curve factor 1 year:	0.83	0.83
Growth curve factor 30 years:	2	2
Growth curve factor 100 years:	2.57	2.57
Growth curve factor 200 years:	3.04	3.04

Notes

(1) Is $Q_{BAR} < 2.0$ l/s/ha?

When Q_{BAR} is < 2.0 l/s/ha then limiting discharge rates are set at 2.0 l/s/ha.

(2) Are flow rates < 5.0 l/s?

Where flow rates are less than 5.0 l/s consent for discharge is usually set at 5.0 l/s if blockage from vegetation and other materials is possible. Lower consent flow rates may be set where the blockage risk is addressed by using appropriate drainage elements.

(3) Is $SPR/SPRHOST \leq 0.3$?

Where groundwater levels are low enough the use of soakaways to avoid discharge offsite would normally be preferred for disposal of surface water runoff.

Q_{BAR} (l/s):		6.06
1 in 1 year (l/s):		5.03
1 in 30 years (l/s):		12.12
1 in 100 year (l/s):		15.58
1 in 200 years (l/s):		18.43

This report was produced using the greenfield runoff tool developed by HR Wallingford and available at www.uksuds.com. The use of this tool is subject to the UK SuDS terms and conditions and licence agreement , which can both be found at www.uksuds.com/terms-and-conditions.htm. The outputs from this tool are estimates of greenfield runoff rates. The use of these results is the responsibility of the users of this tool. No liability will be accepted by HR Wallingford, the Environment Agency, CEH, Hydrosolutions or any other organisation for the use of this data in the design or operational characteristics of any drainage scheme.

SURFACE WATER RUN-OFF CALCULATION SHEET

Development Oakmoor Road, Cheadle
Project No. HYD759

Revision B **Completed by** HB
Date 03/08/2023 **Checked by** KH

Areas		
Total Site	2.180	ha
Development Area ¹	0.729	ha
Existing Impermeable	0.000	ha
Existing Impermeable ²	0.000	ha
Existing Pervious	2.180	ha
Existing Pervious ²	0.000	ha
Proposed total impermeable	0.940	ha

Catchment Characteristics		
SAAR	872	mm
SPR	0.47	
BFI	0.474	
i ₁	17.8	mm/hr
i ₃₀	34.2	mm/hr
i ₁₀₀	46.3	mm/hr
d ₁	25.1	mm
d ₃₀	50.1	mm
d ₁₀₀	64.7	mm

Run-off Rates			
Pre-development			
Impermeable -----	1yr	0.0	l/s
	30yr	0.0	l/s
	100yr	0.0	l/s
	40mm/hr ³	0.0	l/s
Pervious ⁴ -----	1yr	3.7	l/s
	30yr	8.8	l/s
	100yr	11.4	l/s
	QBar ⁵	4.4	l/s
Total -----	1yr	3.7	l/s
	30yr	8.8	l/s
	100yr	11.4	l/s
Post-development (without control)			
Impermeable ⁶ -----	1yr	46.6	l/s
	30yr	89.3	l/s
	100yr+40%CC	169.1	l/s

Volumes			
Pre-development			
Impermeable -----	1yr	0.0	cu.m
	30yr	0.0	cu.m
	100yr	0.0	cu.m
Pervious ⁴ -----	1yr	91.5	cu.m
	30yr	185.2	cu.m
	100yr	262.9	cu.m
Total -----	1yr	91.5	cu.m
	30yr	185.2	cu.m
	100yr	262.9	cu.m
Post-development			
Impermeable ⁶ -----	1yr	235.9	cu.m
	30yr	471.3	cu.m
	100yr	607.7	cu.m

Stormwater Storage Estimates					
Restricted Rate of 5.0l/s					
Microdrainage Quick Storage Estimates (using FEH catchment data)					
Return Period	Rate	lower	upper	mean	
1yr	5.0 l/s	119	202	160.5 cu.m	
30yr	5.0 l/s	307	409	358 cu.m	
100yr+40%CC	5.0 l/s	677	810	743.5 cu.m	

1/ The 'development area' removes areas of POS and/or landscaped areas of the wider site that are to remain as existing.
 2/ On occasion the existing impermeable area cannot be evidenced to connect and a reduction is applied.
 3/ 50mm/hr is used for BRegs calculations and often used by Water Companies when considering allowable post-development rates of discharge. (Rational Method)
 4/ The Greenfield rates and of run-off have been calculated using the UK SUDS Calculator
 5/ QBar is the estimated flood flow for the 2.33yr return period event and is often used as a post-development rate restriction.
 6/ Post-development run-off is only considered from the impermeable area when the proposed post-development impermeable area >50% in accordance with the EA Guidance Preliminary rainfall runoff management for developments (WS-074/A/TR1/1 rev E (2012)).

NB. The catchment characteristics are from the FEH catchment, the UK SUDS Calculator and Microdrainage.
 NB. The rainfall intensities and depths are calculated for the 6hr duration rainfall event (peak summer intensity)

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Old Marsh Farm Barns Welsh Road Sealand Flintshire CH5 2LY	Oakamoor Road Cheadle	
Date 03/08/2023	Designed by HB	
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Micro Drainage		Source Control 2020.1.3

Greenfield Runoff Volume

FEH Data

Return Period (years)	2
Storm Duration (mins)	360
FEH Rainfall Version	2013
Site Location	GB 401772 343736 SK 01772 43736
Data Type	Point
Areal Reduction Factor	1.00
Area (ha)	0.729
SAAR (mm)	872
CWI	120.830
SPR Host	47.000
URBEXT (1990)	0.0000

Results

Percentage Runoff (%)	45.96
Greenfield Runoff Volume (m³)	91.464

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Old Marsh Farm Barns	Oakamoor Road	
Welsh Road	Cheadle	
Sealand Flintshire CH5 2LY		
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Micro Drainage	Source Control 2020.1.3	

Greenfield Runoff Volume

FEH Data

Return Period (years)	30
Storm Duration (mins)	360
FEH Rainfall Version	2013
Site Location	GB 401772 343736 SK 01772 43736
Data Type	Point
Areal Reduction Factor	1.00
Area (ha)	0.729
SAAR (mm)	872
CWI	120.830
SPR Host	47.000
URBEXT (1990)	0.0000

Results

Percentage Runoff (%)	48.57
Greenfield Runoff Volume (m³)	185.237

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Micro Drainage		
Source Control 2020.1.3		

Greenfield Runoff Volume

FEH Data

Return Period (years)	100
Storm Duration (mins)	360
FEH Rainfall Version	2013
Site Location	GB 401772 343736 SK 01772 43736
Data Type	Point
Areal Reduction Factor	1.00
Area (ha)	0.729
SAAR (mm)	872
CWI	120.830
SPR Host	47.000
URBEXT (1990)	0.0000

Results

Percentage Runoff (%)	50.92
Greenfield Runoff Volume (m³)	262.862

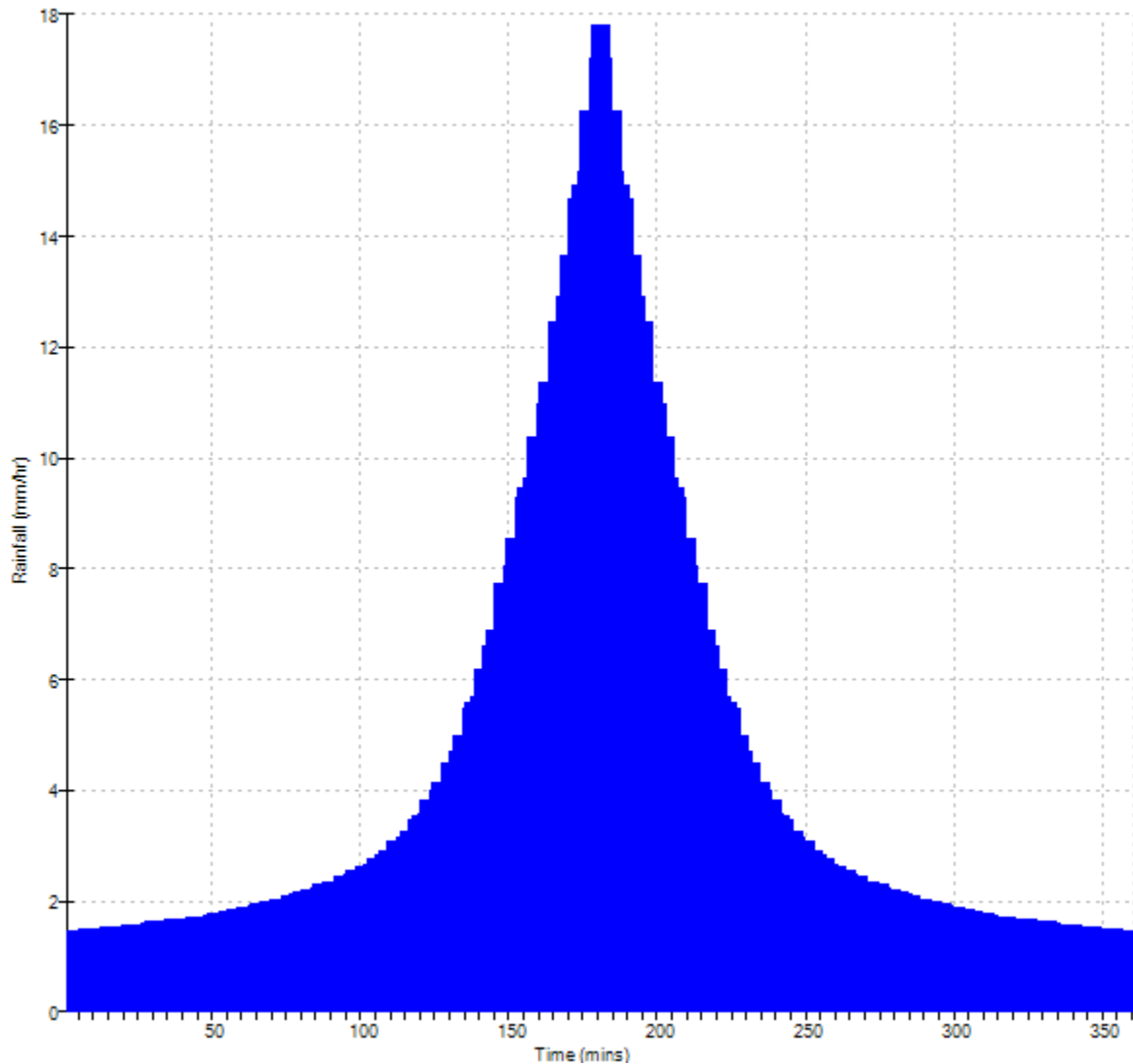
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Old Marsh Farm Barns Welsh Road Sealand Flintshire CH5 2LY		
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File	Checked by	
Micro Drainage		Network 2018.1

Rainfall profile

Storm duration (mins) 360

FEH Data

FEH Rainfall Version	2013
Site Location	GB 401772 343736 SK 01772 43736
Data Type	Point
Peak Intensity (mm/hr)	17.836
Ave. Intensity (mm/hr)	4.550
Return Period (years)	2.0



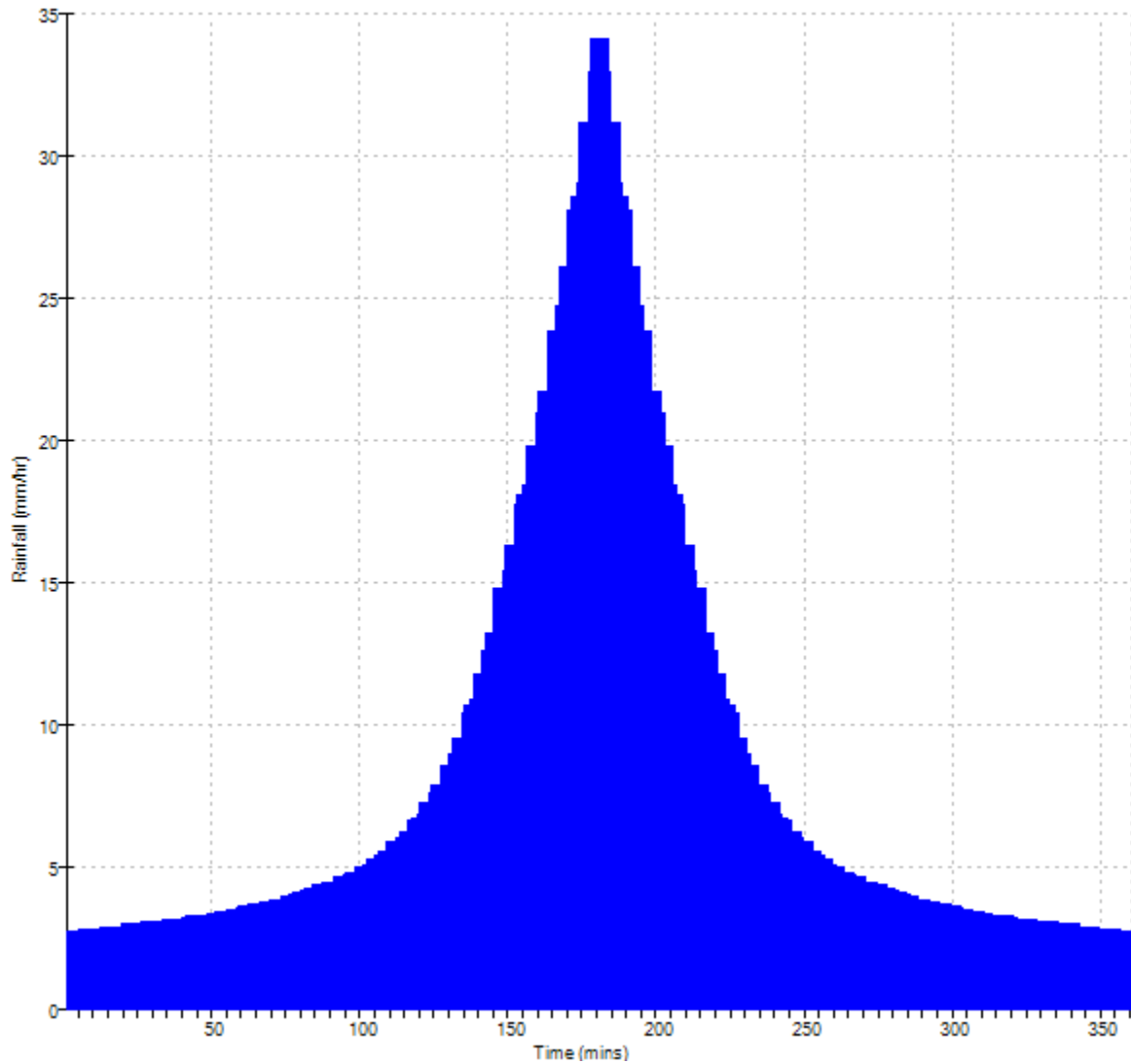
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Micro Drainage		Network 2018.1

Rainfall profile

Storm duration (mins) 360

FEH Data

FEH Rainfall Version	2013
Site Location GB 401772 343736 SK 01772 43736	
Data Type	Point
Peak Intensity (mm/hr)	34.181
Ave. Intensity (mm/hr)	8.720
Return Period (years)	30.0



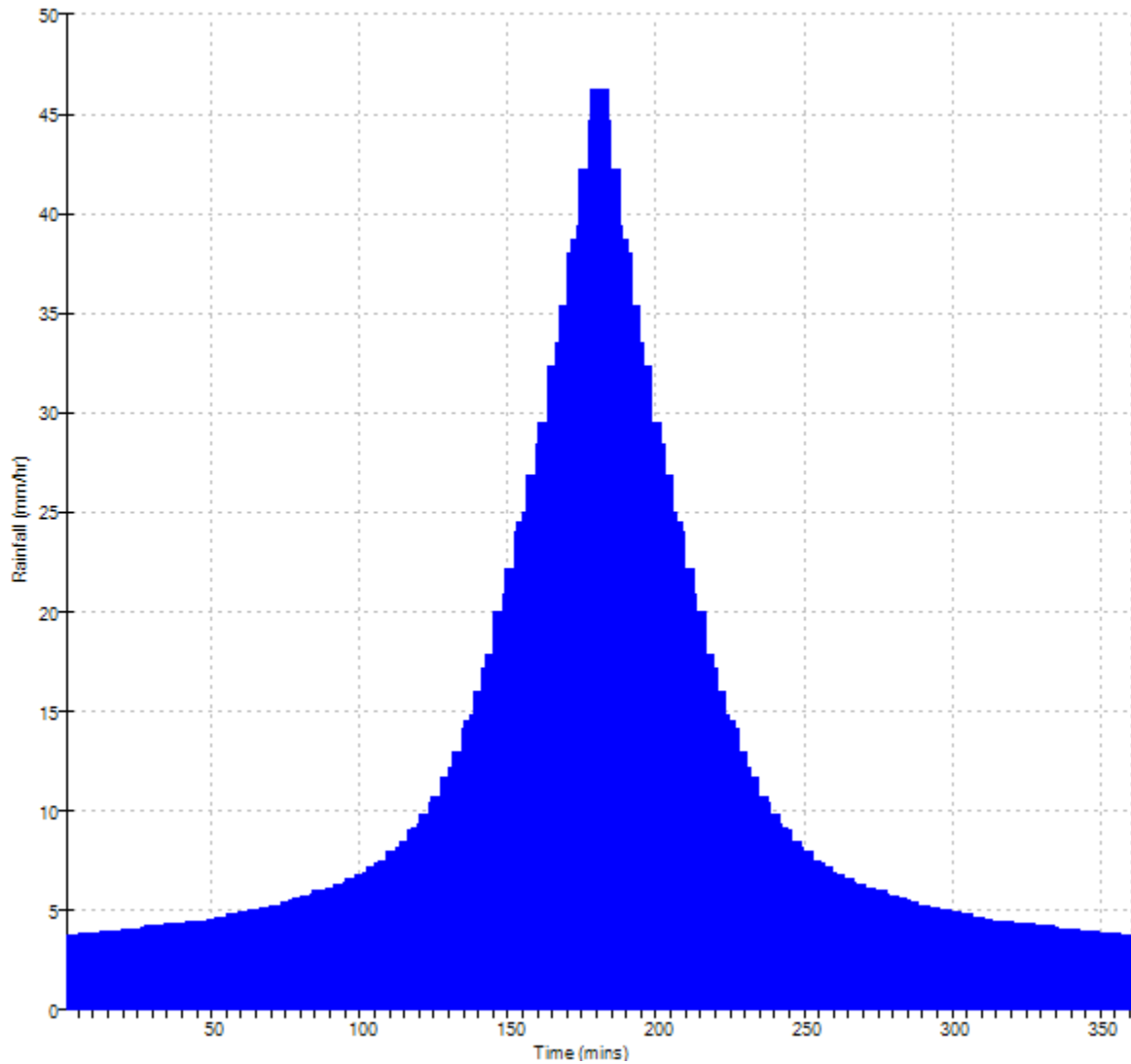
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Micro Drainage		Network 2018.1

Rainfall profile

Storm duration (mins) 360

FEH Data

FEH Rainfall Version	2013
Site Location GB 401772 343736 SK 01772 43736	
Data Type	Point
Peak Intensity (mm/hr)	46.268
Ave. Intensity (mm/hr)	11.803
Return Period (years)	100.0



APPENDIX K: DRAINAGE PLANS

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