

Appendix E – Existing Drainage Calculations

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Greenfield runoff rate estimation for sites

www.uksuds.com | Greenfield runoff tool

Calculated by: Luke Hornblow

Site name: Brunel Walk

Site location: Brunel Walk

Site Details

Latitude: 51.58429° N

Longitude: 0.07998° W

Reference: 4215588517

Date: Apr 13 2022 17:17

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.

Runoff estimation approach: IH124

Site characteristics

Total site area (ha): 0.4272

Methodology

Q_{BAR} estimation method: Calculate from SPR and SAAR

SPR estimation method: Calculate from SOIL type

Soil characteristics

Default Edited

SOIL type: 4 4

HOST class: N/A N/A

SPR/SPRHOST: 0.47 0.47

Hydrological characteristics

Default Edited

SAAR (mm): 620 620

Hydrological region: 6 6

Growth curve factor 1 year: 0.85 0.85

Growth curve factor 30 years: 2.3 2.3

Growth curve factor 100 years: 3.19 3.19

Growth curve factor 200 years: 3.74 3.74

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.

Greenfield runoff rates

Default Edited

Q_{BAR} (l/s): 1.79 1.79

1 in 1 year (l/s): 1.52 1.52

1 in 30 years (l/s): 4.12 4.12

1 in 100 year (l/s): 5.71 5.71

1 in 200 years (l/s): 6.69 6.69

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.

Meinhardt (UK) Ltd		Page 1
10 Aldersgate Street London EC1A 4HJ		
Date 19/04/2022 10:27 File 2844 - Existing SW Drai...	Designed by Luke.Hornblow Checked by	
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STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FEH Rainfall Model

Return Period (years)	100
FEH Rainfall Version	2013
Site Location	GB 533126 189013 TQ 33126 89013
Data Type	Point
Maximum Rainfall (mm/hr)	50
Maximum Time of Concentration (mins)	30
Foul Sewage (l/s/ha)	0.000
Volumetric Runoff Coeff.	0.750
PIMP (%)	100
Add Flow / Climate Change (%)	0
Minimum Backdrop Height (m)	0.200
Maximum Backdrop Height (m)	1.500
Min Design Depth for Optimisation (m)	1.200
Min Vel for Auto Design only (m/s)	1.00
Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Meinhardt (UK) Ltd		Page 2
10 Aldersgate Street London EC1A 4HJ		
Date 19/04/2022 10:27 File 2844 - Existing SW Drai...	Designed by Luke.Hornblow Checked by	
Innovyze	Network 2020.1	

Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	-	-	100	0.054	0.054	0.054
1.001	-	-	100	0.054	0.054	0.054
1.002	-	-	100	0.054	0.054	0.054
1.003	-	-	100	0.055	0.055	0.055
				Total	Total	Total
				0.217	0.217	0.217

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m ³ /ha Storage	2.000
Hot Start (mins)	0	Inlet Coefficient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1
Number of Input Hydrographs	0	Number of Storage Structures	0
Number of Online Controls	0	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	2	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.700	Storm Duration (mins)	30
Ratio R	0.438		

Meinhardt (UK) Ltd						Page 4			
10 Aldersgate Street London EC1A 4HJ									
Date 19/04/2022 10:27 File 2844 - Existing SW Drai...				Designed by Luke.Hornblow Checked by					
Innovyze				Network 2020.1					
<u>30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)</u> <u>for Storm</u>									
<u>Simulation Criteria</u>									
Areal Reduction Factor		1.000		Additional Flow - % of Total Flow		0.000			
Hot Start (mins)		0		MADD Factor * 10m³/ha Storage		2.000			
Hot Start Level (mm)		0		Inlet Coeffiecient		0.800			
Manhole Headloss Coeff (Global)		0.500		Flow per Person per Day (l/per/day)		0.000			
Foul Sewage per hectare (l/s)		0.000							
Number of Input Hydrographs				0		Number of Storage Structures		0	
Number of Online Controls				0		Number of Time/Area Diagrams		0	
Number of Offline Controls				0		Number of Real Time Controls		0	
<u>Synthetic Rainfall Details</u>									
Rainfall Model				FEH					
FEH Rainfall Version				2013					
Site Location				GB 532106 178436 TQ 32106 78436					
Data Type				Point					
Cv (Summer)				0.750					
Cv (Winter)				0.840					
Margin for Flood Risk Warning (mm)				300.0		DVD Status		OFF	
Analysis Timestep				Fine		Inertia Status		OFF	
DTS Status				ON					
Profile(s)				Summer and Winter					
Duration(s) (mins)		15, 30, 60, 120, 240, 360, 480, 960, 1440							
Return Period(s) (years)		2, 30, 100							
Climate Change (%)		0, 0, 0							

Meinhardt (UK) Ltd							Page 5																																																																			
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