

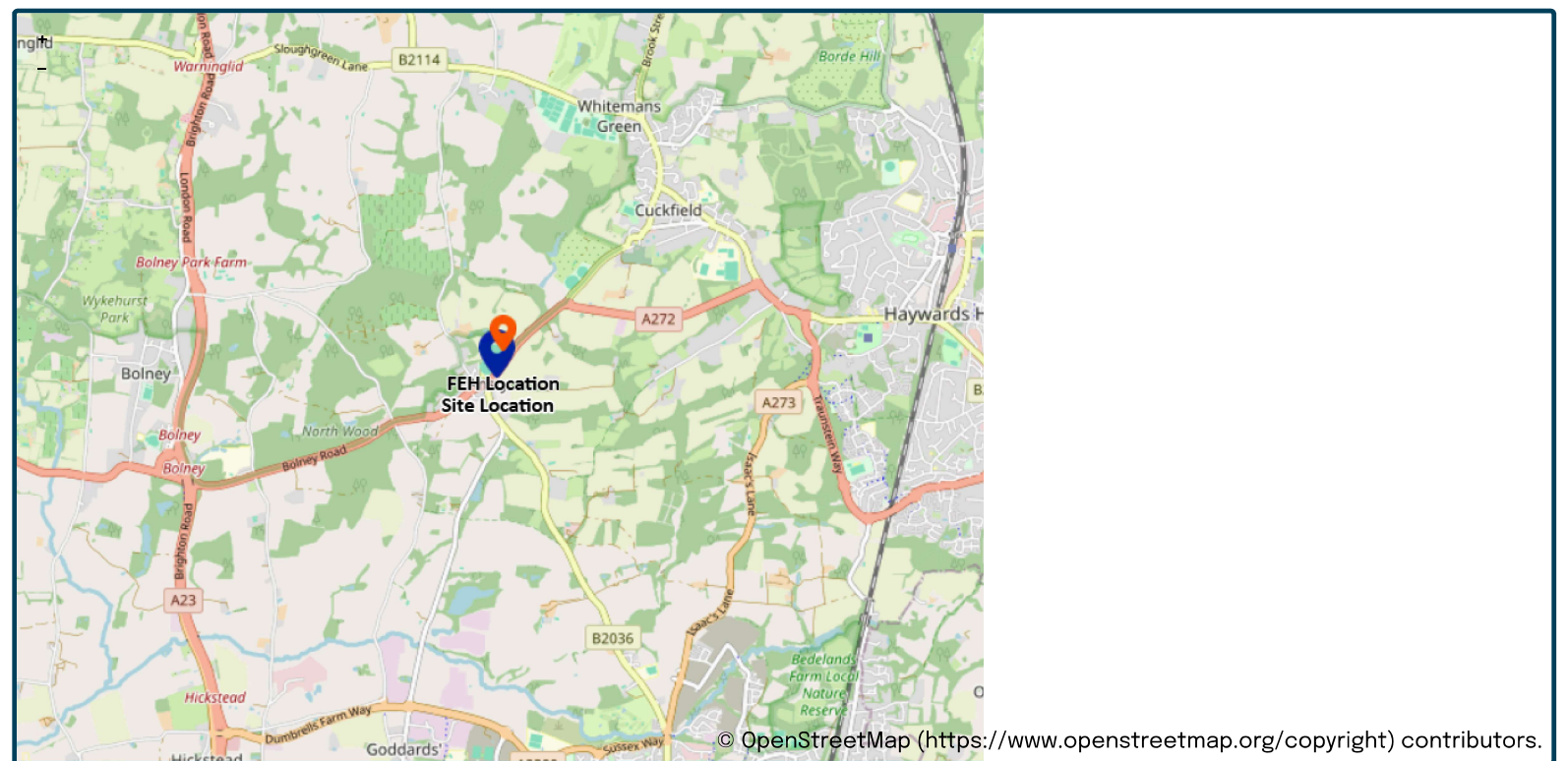
This is an estimation of the storage volume requirements that are needed to meet normal best practice criteria in line with Environment Agency guidance “Rainfall runoff management for developments”, SC030219 (2013), the SuDS Manual C753 (CIRIA, 2015) and the non-statutory standards for SuDS (Defra, 2015). It is recommended that the total storage volume for the site is distributed across the site using multiple SuDS and that hydraulic modelling software is used to undertake and finalise the detailed design of the drainage system.

Project details

Date	19/03/2026
Calculated by	Richard Pelham
Reference	PTC-BTF-005-01
Model version	2.2.3

Location

Site name	Birch Tree Farm
Site location	Ansty



Site easting (British National Grid)	529207
Site northing (British National Grid)	123174

Site areas

Total site area (ha)	0.0704	ha
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Roof area

Total roof area (ha)	0.0169	ha
Contributing roof area (ha)	0.0169	ha
Non-contributing roof area (ha)	0	ha

Paved area

Total paved area (ha)	0.00134	ha
Contributing paved area (ha)	0.00134	ha
Non-contributing paved area (ha)	0	ha

Grass / vegetated area

Total grass / vegetated area (ha)	0.0179	ha
Contributing grass / vegetated area (ha)	0	ha
Non-contributing grass / vegetated area (ha)	0.0179	ha

Total area

Total contributing area (ha)	0.01824	ha
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Contributing areas with urban creep allowance

Urban creep allowance factor	+10%	
Contributing roof area (adjusted for urban creep) (ha)	0.0169	ha
Contributing paved area (adjusted for urban creep) (ha)	0.00134	ha
Contributing grass / vegetated area (adjusted for urban creep) (ha)	0	ha

Storage design parameters

Storage base shape	Rectangular / square	
Storage base length to width ratio	2:1	
Storage design depth (m)	0.548	m
Storage side slope (1 in x)	1 in 1	
Storage voids ratio (%)	90% (e.g. geocellular crate systems)	
Storage volume design return period (years)	1:100 years	

Discharge flow rate from the site

Method

Type of site

Greenfield

Specify the method

FEH statistical (2025)

FEH statistical (2025)

My value

SAAR9120 (mm)

856

mm

BFIHOST19scaled

0.439

QMed (l/s)

0.2

l/s

QMed-QBar conversion

1.136

1.136

Total area for greenfield runoff calculation (ha)

0.03614

ha

0.03614

QBar (l/s)

0.2

l/s

Hydrological region

7

7

Return period (years)

Qbar (1:2.3 years)

Growth curve factor

1

Map/default value

Final discharge rate

Runoff calculation method

FEH statistical (2025)

Design flow rate (l/s)

0.2

l/s

Blockage risk

Specify the method

Orifice diameter

Minimum orifice diameter to prevent blockage (mm)

19

mm

My value

Design orifice diameter (mm)

11

mm

Flow rate of orifice (l/s)

0.19

l/s

Calculated value

19

Rainfall and runoff

Rainfall input type

FEH22 CSV file

FEH_Point_Rainfall_FEH22_AM_529259_123298 (1).csv

Distance from FEH location to site (km)

0.1

km

Climate change allowance factor

145%

Specify the runoff method from grass / vegetated areas

Fixed percentage - based on rainfall event depth and SPR

My value

How should SPR be derived?

Estimate using BFI

Map value

Model results

- Maximum discharge flow rate: 0.2 (l/s)
- Outflow orifice diameter: 11 (mm)
- Storage base length: 7.3 (m)
- Storage base width: 3.7 (m)
- Storage base area: 27 (m²)
- Storage total volume: 19 (m³)
- Storage total water volume: 17 (m³)
- Storm return periods run: 1, 2, 10, 30, 100, 200 (years)
- Storm durations run: 15, 30, 60, 120, 180, 240, 360, 540, 720, 900, 1080, 1440, 1800, 2160, 2880, 3600, 4320, 5040, 5760 (minutes)

Return Period (years)	Critical Duration (minutes)	Peak Flow Rate (l/s)	Max Depth (m)	Max water volume (m ³)	Max storage volume (m ³)
1	720	0.1	0.19	5.1	5.7
2	720	0.1	0.23	6.1	6.8
10	720	0.1	0.35	10	11
30	720	0.2	0.44	13	14
100	1080	0.2	0.55	17	19
200	1080	0.2	0.63	20	22

Please note runoff estimation and storage volume estimation are subject to uncertainty. Storage volume results are therefore reported to the nearest 1 m³ value, unless storage volumes are less than 10 m³, in which case, storage volumes are provided to 1 decimal place.

Disclaimer

This report was produced using the surface water storage volume design tool (2.2.3) developed by HR Wallingford and available at uksuds.com (<https://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 uksuds.com/terms-conditions (<https://www.uksuds.com/terms-conditions>). The outputs from this tool have been used to estimate surface water storage volumes for the whole site based on a limiting discharge rate from the site. 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, Centre for Ecology and Hydrology, Wallingford Hydrosolutions or any other organisation for the use of these data in the design or operational characteristics of any drainage scheme.

HR Wallingford are not responsible for any rainfall data shared that is subject to licensing terms imposed by UK Centre for Ecology & Hydrology's Flood Estimation Handbook web service (<https://fehweb.ceh.ac.uk/Home/Terms> (<https://fehweb.ceh.ac.uk/Home/Terms>)).

Appendix A – Rainfall Depths

Rainfall depths (mm) with climate change

Duration (minutes)	Duration (hours)	1 years	2 years	10 years	30 years	100 years	200 years
15	0.25	8.45	11.37	22.33	29.23	36.83	41.32
30	0.5	11.18	14.94	29.58	39.00	49.36	55.94
60	1	14.22	18.91	37.41	49.50	63.42	71.92
120	2	21.43	26.74	47.41	60.74	76.17	85.83
180	3	26.10	31.74	53.78	67.90	84.51	95.16
240	4	29.48	35.38	58.42	73.20	90.84	102.43
360	6	34.21	40.50	64.92	80.78	100.33	113.69
540	9	38.95	45.62	71.48	88.65	110.77	126.66
720	12	42.42	49.34	76.28	94.50	118.83	136.82
900	15	45.17	52.32	80.14	99.25	125.56	145.19
1080	18	47.55	54.85	83.39	103.27	131.28	152.26
1440	24	51.61	59.16	88.78	109.88	140.68	163.53
1800	30	55.20	62.94	93.44	115.49	148.29	172.39
2160	36	58.45	66.40	97.66	120.49	154.82	179.86
2880	48	64.42	72.70	105.27	129.33	165.84	192.13
3600	60	70.13	78.69	112.33	137.17	174.97	202.01
4320	72	75.57	84.38	118.96	144.38	183.09	210.66
5040	84	80.85	89.87	125.29	151.15	190.52	218.47
5760	96	85.97	95.21	131.40	157.60	197.43	225.68

Rainfall depths (mm) without climate change

Duration (minutes)	Duration (hours)	1 years	2 years	10 years	30 years	100 years	200 years
15	0.25	5.83	7.84	15.40	20.16	25.40	28.50
30	0.5	7.71	10.30	20.40	26.90	34.04	38.58
60	1	9.81	13.04	25.80	34.14	43.74	49.60
120	2	14.78	18.44	32.70	41.89	52.53	59.19
180	3	18.00	21.89	37.09	46.83	58.28	65.63
240	4	20.33	24.40	40.29	50.48	62.65	70.64
360	6	23.59	27.93	44.77	55.71	69.19	78.41
540	9	26.86	31.46	49.30	61.14	76.39	87.35
720	12	29.25	34.03	52.61	65.17	81.95	94.36
900	15	31.15	36.08	55.27	68.45	86.59	100.13
1080	18	32.79	37.83	57.51	71.22	90.54	105.01

Duration (minutes)	Duration (hours)	1 years	2 years	10 years	30 years	100 years	200 years
1440	24	35.60	40.80	61.23	75.78	97.02	112.78
1800	30	38.07	43.41	64.44	79.65	102.27	118.89
2160	36	40.31	45.79	67.35	83.10	106.77	124.04
2880	48	44.43	50.14	72.60	89.19	114.37	132.50
3600	60	48.37	54.27	77.47	94.60	120.67	139.32
4320	72	52.12	58.19	82.04	99.57	126.27	145.28
5040	84	55.76	61.98	86.41	104.24	131.39	150.67
5760	96	59.29	65.66	90.62	108.69	136.16	155.64