

Calculated by: Hedwilena Silva

Site name: Land Adj Mistletoe Farm

Site location: Horsemere Green Lane

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: 50.81131° N

Longitude: 0.58717° W

Reference: 411391664

Date: Nov 05 2021 13:38

Runoff estimation approach: IH124

Site characteristics

Total site area (ha): 0.0689

Methodology

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

SPR estimation method: Calculate from SOIL type

Soil characteristics

Default

Edited

SOIL type: 3 3

HOST class: N/A N/A

SPR/SPRHOST: 0.37 0.37

Hydrological characteristics

Default

Edited

SAAR (mm): 722 722

Hydrological region: 7 7

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): 0.21 0.21

1 in 1 year (l/s): 0.17 0.17

1 in 30 years (l/s): 0.47 0.47

1 in 100 year (l/s): 0.65 0.65

1 in 200 years (l/s): 0.77 0.77

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.

Job No.	435358	Sheet	1	Date	Jun-21
Job	Land Adj Mistletoe	By	TB	Checked	EG

RPA Access Road Storage

Total Surface Area

Area	105.000 m ²
Urban Creep	1.000 m ²
	105.000 m ²

10 year return period

R5	0.009 m
R10	0.012 m
R15	0.015 m
R30	0.020 m
R60	0.025 m
R120	0.030 m
R240	0.036 m
R360	0.041 m
R600	0.047 m
R1440	0.058 m

Storm duration (Min.)

5
10
15
30
60
120
240
360
600
1440

Inflow to attenuation system

I5	0.91 m ³
I10	1.30 m ³
I15	1.61 m ³
I30	2.06 m ³
I60	2.60 m ³
I120	3.18 m ³
I240	3.81 m ³
I360	4.29 m ³
I600	4.89 m ³
I1440	6.07 m ³

Outflow from Tank

f	2.00E-03 m ³ /s
---	----------------------------

Soakaway dims:

Length	8 m
Width	8 m
Depth	0.2 m

As50	1
Void ratio	30 %

Outflow from Tank:

O5	0.6000 m ³
O10	1.2000 m ³
O15	1.8000 m ³
O30	3.6000 m ³
O60	7.2000 m ³
O120	14.4000 m ³
O240	28.8000 m ³
O360	43.2000 m ³
O600	72.0000 m ³
O1440	172.8000 m ³

Storage required:

S5	0.31 m ³
S10	0.10 m ³
S15	-0.19 m ³
S30	-1.54 m ³
S60	-4.60 m ³
S120	-11.22 m ³
S240	-24.99 m ³
S360	-38.91 m ³
S600	-67.11 m ³
S1440	-166.73 m ³

Storage provided **3.8** m³

Time to drain:

ts50	0.02 hours
ts50	0.01 hours
ts50	-0.01 hours
ts50	-0.11 hours
ts50	-0.32 hours
ts50	-0.78 hours
ts50	-1.74 hours
ts50	-2.70 hours
ts50	-4.66 hours
ts50	-11.58 hours

Critical storm =	S5		
Storage required =	0.31		
Time to discharge=	0.02	Hours	0.00 Days

Tank size proposed is satisfactory

Allowance for extra rain during storage period (assume average rainfall)

Average daily rain	2.60 mm
Extra rain during storage	0.00 m ³

Proposed soakaway material requires a void ratio $\geq 95\%$.
The use of Polypipe Permavoid sub- base replacement system is recommended. Proposed design includes for 40% increase due to Climate Change.

Job No.	435358	Sheet	Date	Jun-21
Job	Land Adj Mistletoe	By TB	Checked	EG

RPA Access Road Storage

Total Surface Area

Area	105.000 m ²
Urban Creep	1.000 m ²
	105.000 m ²

30 year return period + 40%

		Storm duration (Min.)
R5	0.022 m	5
R10	0.028 m	10
R15	0.031 m	15
R30	0.039 m	30
R60	0.048 m	60
R120	0.059 m	120
R240	0.073 m	240
R360	0.082 m	360
R600	0.095 m	600
R1440	0.123 m	1440

Inflow to attenuation system

I5	2.32 m ³
I10	2.90 m ³
I15	3.29 m ³
I30	4.08 m ³
I60	5.04 m ³
I120	6.21 m ³
I240	7.63 m ³
I360	8.60 m ³
I600	9.99 m ³
I1440	12.89 m ³

Outflow from Tank

f 2.00E-03 m³/s

Soakaway dims:

L	8 m
W	8 m
Depth	0.2 m

As50 1
Void ratio 30 %

Outflow from Tank:

O5	0.6000 m ³
O10	1.2000 m ³
O15	1.8000 m ³
O30	3.6000 m ³
O60	7.2000 m ³
O120	14.4000 m ³
O240	28.8000 m ³
O360	43.2000 m ³
O600	72.0000 m ³
O1440	172.8000 m ³

Storage required:

S5	1.72 m ³
S10	1.70 m ³
S15	1.49 m ³
S30	0.48 m ³
S60	-2.16 m ³
S120	-8.19 m ³
S240	-21.17 m ³
S360	-34.60 m ³
S600	-62.01 m ³
S1440	-159.91 m ³

Time to half drain:

ts50	0.12 hours
ts50	0.12 hours
ts50	0.10 hours
ts50	0.03 hours
ts50	-0.15 hours
ts50	-0.57 hours
ts50	-1.47 hours
ts50	-2.40 hours
ts50	-4.31 hours
ts50	-11.10 hours

Storage provided 3.8 m³

Critical storm = S5

Storage required = 1.72

Time to half discharge = 0.12 Hours (Acceptable time as 1/30 year storm)

Tank size proposed is satisfactory

For increase from 10 year storm to 30 year storm use,
Bilham's formula $r \text{ (mm)} = (((1.25T)/N)^{(1/3.55)}) \times 25.4$

T = storm duration in hours

N = No. of storms in 10 years

T	N	r	0.4 10 year return period
0.083333	0.333333	0.015764	0.022069124 R5 0.0087 m
0.166667	0.333333	0.01971	0.027594367 R10 0.0124 m
0.25	0.333333	0.022402	0.031363365 R15 0.0153 m
0.5	0.333333	0.02778	0.038892614 R30 0.0196 m
1	0.333333	0.034318	0.048045307 R60 0.0248 m
2	0.333333	0.042265	0.059171486 R120 0.0303 m
4	0.333333	0.051926	0.072696672 R240 0.0363 m
6	0.333333	0.058516	0.081922764 R360 0.0409 m
10	0.333333	0.07	0.095151657 R600 0.0466 m
24	0.333333	0.087685	0.122758323 R1440 0.0578 m

Job No.	435358	Sheet	Date	Jun-21
Job	Land Adj Mistletoe	By TB	Checked	EG

RPA Access Road Storage

Total Surface Area

Area	105.000 m ²
Urban Creep	1.000 m ²
	105.000 m ²

100 year return period + 40%

		Storm duration (Min.)
R5	0.032 m	5
R10	0.040 m	10
R15	0.045 m	15
R30	0.056 m	30
R60	0.069 m	60
R120	0.084 m	120
R240	0.103 m	240
R360	0.116 m	360
R600	0.135 m	600
R1440	0.174 m	1440

Inflow to attenuation system

I5	3.40 m ³
I10	4.22 m ³
I15	4.77 m ³
I30	5.88 m ³
I60	7.23 m ³
I120	8.87 m ³
I240	10.87 m ³
I360	12.23 m ³
I600	14.18 m ³
I1440	18.24 m ³

Outflow from Tank

f	2.00E-03 m ³ /s
---	----------------------------

Soakaway dims:

L	8 m
W	8 m
Depth	0.2 m
As50	1
Void ratio	30 %

Outflow from Tank:

O5	0.6000 m ³
O10	1.2000 m ³
O15	1.8000 m ³
O30	3.6000 m ³
O60	7.2000 m ³
O120	14.4000 m ³
O240	28.8000 m ³
O360	43.2000 m ³
O600	72.0000 m ³
O1440	172.8000 m ³

Storage required:

S5	2.80 m ³
S10	3.02 m ³
S15	2.97 m ³
S30	2.28 m ³
S60	0.03 m ³
S120	-5.53 m ³
S240	-17.93 m ³
S360	-30.97 m ³
S600	-57.82 m ³
S1440	-154.56 m ³

Time to half drain:

ts50	0.19 hours
ts50	0.21 hours
ts50	0.21 hours
ts50	0.16 hours
ts50	0.00 hours
ts50	-0.38 hours
ts50	-1.25 hours
ts50	-2.15 hours
ts50	-4.02 hours
ts50	-10.73 hours

Storage provided **3.8** m³

Critical storm = **S10**

Storage required = **3.02**

Time to half discharge = **0.21** Hours (Acceptable time as 1/100 year storm)

Tank size proposed is satisfactory

For increase from 10 year storm to 100 year storm use,

Bilham's formula $r \text{ (mm)} = (((1.25T)/N)^{(1/3.55)}) \times 25.4$

T = storm duration in hours

N = No. of storms in 10 years

T	N	r	0.4 10 year return period
0.083333	0.1	0.023154	0.03241527 R5
0.166667	0.1	0.028694	0.040171329 R10
0.25	0.1	0.032473	0.045462061 R15
0.5	0.1	0.040022	0.056031245 R30
1	0.1	0.0492	0.068879338 R60
2	0.1	0.060356	0.084497712 R120
4	0.1	0.073917	0.103483692 R240
6	0.1	0.083168	0.116434821 R360
10	0.1	0.10	0.135004879 R600
24	0.1	0.124113	0.173757739 R1440

Job No.	435358	Sheet	1	Date	Jun-21
Job	Land Adj Mistletoe	By	TB	Checked	EG

Permavoid Attenuation Storage for Roofs, Access Road & Parking

Total Surface Area

Area	295.000 m ²
Urban Creep	1.000 m ²
	295.000 m ²

10 year return period

		Storm duration (Min.)
R5	0.009 m	5
R10	0.012 m	10
R15	0.015 m	15
R30	0.020 m	30
R60	0.025 m	60
R120	0.030 m	120
R240	0.036 m	240
R360	0.041 m	360
R600	0.047 m	600
R1440	0.058 m	1440

Inflow to attenuation system

I5	2.57 m ³
I10	3.66 m ³
I15	4.51 m ³
I30	5.78 m ³
I60	7.32 m ³
I120	8.94 m ³
I240	10.71 m ³
I360	12.07 m ³
I600	13.75 m ³
I1440	17.05 m ³

Outflow from Tank

f	2.00E-03 m ³ /s
---	----------------------------

Soakaway dims:

Length	7 m
Width	5 m
Depth	0.4 m

As50	1
Void ratio	95 %

Outflow from Tank:

O5	0.6000 m ³
O10	1.2000 m ³
O15	1.8000 m ³
O30	3.6000 m ³
O60	7.2000 m ³
O120	14.4000 m ³
O240	28.8000 m ³
O360	43.2000 m ³
O600	72.0000 m ³
O1440	172.8000 m ³

Storage required:

S5	1.97 m ³
S10	2.46 m ³
S15	2.71 m ³
S30	2.18 m ³
S60	0.12 m ³
S120	-5.46 m ³
S240	-18.09 m ³
S360	-31.13 m ³
S600	-58.25 m ³
S1440	-155.75 m ³

Storage provided **13.3** m³

Time to drain:

ts50	0.14 hours
ts50	0.17 hours
ts50	0.19 hours
ts50	0.15 hours
ts50	0.01 hours
ts50	-0.38 hours
ts50	-1.26 hours
ts50	-2.16 hours
ts50	-4.05 hours
ts50	-10.82 hours

Critical storm =	S15	
Storage required =	2.72	
Time to discharge =	0.19 Hours	0.01 Days

Tank size proposed is satisfactory

Allowance for extra rain during storage period (assume average rainfall)

Average daily rain	2.60 mm
Extra rain during storage	0.01 m ³

Proposed soakaway material requires a void ratio $\geq 95\%$.
The use of Polypipe Permavoid sub- base replacement system is recommended. Proposed design includes for 40% increase due to Climate Change.

Job No.	435358	Sheet	Date	Jun-21
Job	Land Adj Mistletoe	By TB	Checked	EG

Permavoid Attenuation Storage for Roofs, Access Road & Parking

Total Surface Area

Area	295.000 m ²
Urban Creep	1.000 m ²
	295.000 m ²

30 year return period + 40%

		Storm duration (Min.)
R5	0.022 m	5
R10	0.028 m	10
R15	0.031 m	15
R30	0.039 m	30
R60	0.048 m	60
R120	0.059 m	120
R240	0.073 m	240
R360	0.082 m	360
R600	0.095 m	600
R1440	0.123 m	1440

Inflow to attenuation system

I5	6.51 m ³
I10	8.14 m ³
I15	9.25 m ³
I30	11.47 m ³
I60	14.17 m ³
I120	17.46 m ³
I240	21.45 m ³
I360	24.17 m ³
I600	28.07 m ³
I1440	36.21 m ³

Outflow from Tank

f	2.00E-03 m ³ /s
---	----------------------------

Soakaway dims:

L	7 m
W	5 m
Depth	0.4 m

As50	1
Void ratio	95 %

Outflow from Tank:

O5	0.6000 m ³
O10	1.2000 m ³
O15	1.8000 m ³
O30	3.6000 m ³
O60	7.2000 m ³
O120	14.4000 m ³
O240	28.8000 m ³
O360	43.2000 m ³
O600	72.0000 m ³
O1440	172.8000 m ³

Storage required:

S5	5.91 m ³
S10	6.94 m ³
S15	7.45 m ³
S30	7.87 m ³
S60	6.97 m ³
S120	3.06 m ³
S240	-7.35 m ³
S360	-19.03 m ³
S600	-43.93 m ³
S1440	-136.59 m ³

Time to half drain:

ts50	0.41 hours
ts50	0.48 hours
ts50	0.52 hours
ts50	0.55 hours
ts50	0.48 hours
ts50	0.21 hours
ts50	-0.51 hours
ts50	-1.32 hours
ts50	-3.05 hours
ts50	-9.49 hours

Storage provided **13.3** m³

Critical storm = **S30**

Storage required = **7.87**

Time to half discharge = **0.55** Hours (Acceptable time as 1/30 year storm)

Tank size proposed is satisfactory

For increase from 10 year storm to 30 year storm use,
Bilham's formula $r \text{ (mm)} = (((1.25T)/N)^{(1/3.55)}) \times 25.4$

T = storm duration in hours

N = No. of storms in 10 years

T	N	r	0.4 10 year return period
0.083333	0.333333	0.015764	0.022069124 R5
0.166667	0.333333	0.01971	0.027594367 R10
0.25	0.333333	0.022402	0.031363365 R15
0.5	0.333333	0.02778	0.038892614 R30
1	0.333333	0.034318	0.048045307 R60
2	0.333333	0.042265	0.059171486 R120
4	0.333333	0.051926	0.072696672 R240
6	0.333333	0.058516	0.081922764 R360
10	0.333333	0.07	0.095151657 R600
24	0.333333	0.087685	0.122758323 R1440

Job No.	435358	Sheet	Date	Jun-21
Job	Land Adj Mistletoe	By TB	Checked	EG

Permavoid Attenuation Storage for Roofs, Access Road & Parking

Total Surface Area

Area	295.000 m ²
Urban Creep	1.000 m ²
	295.000 m ²

100 year return period + 40%

		Storm duration (Min.)
R5	0.032 m	5
R10	0.040 m	10
R15	0.045 m	15
R30	0.056 m	30
R60	0.069 m	60
R120	0.084 m	120
R240	0.103 m	240
R360	0.116 m	360
R600	0.135 m	600
R1440	0.174 m	1440

Inflow to attenuation system

I5	9.56 m ³
I10	11.85 m ³
I15	13.41 m ³
I30	16.53 m ³
I60	20.32 m ³
I120	24.93 m ³
I240	30.53 m ³
I360	34.35 m ³
I600	39.83 m ³
I1440	51.26 m ³

Outflow from Tank

f	2.00E-03 m ³ /s
---	----------------------------

Soakaway dims:

L	7 m
W	5 m
Depth	0.4 m

As50	1
Void ratio	95 %

Outflow from Tank:

O5	0.6000 m ³
O10	1.2000 m ³
O15	1.8000 m ³
O30	3.6000 m ³
O60	7.2000 m ³
O120	14.4000 m ³
O240	28.8000 m ³
O360	43.2000 m ³
O600	72.0000 m ³
O1440	172.8000 m ³

Storage required:

S5	8.96 m ³
S10	10.65 m ³
S15	11.61 m ³
S30	12.93 m ³
S60	13.12 m ³
S120	10.53 m ³
S240	1.73 m ³
S360	-8.85 m ³
S600	-32.17 m ³
S1440	-121.54 m ³

Time to half drain:

ts50	0.62 hours
ts50	0.74 hours
ts50	0.81 hours
ts50	0.90 hours
ts50	0.91 hours
ts50	0.73 hours
ts50	0.12 hours
ts50	-0.61 hours
ts50	-2.23 hours
ts50	-8.44 hours

Storage provided **13.3** m³

Critical storm = **S60**

Storage required = **13.12**

Time to half discharge = **0.91** Hours (Acceptable time as 1/100 year storm)

Tank size proposed is satisfactory

For increase from 10 year storm to 100 year storm use,

Bilham's formula $r \text{ (mm)} = (((1.25T)/N)^{(1/3.55)}) \times 25.4$

T = storm duration in hours

N = No. of storms in 10 years

T	N	r	0.4 10 year return period
0.083333	0.1	0.023154	0.03241527 R5
0.166667	0.1	0.028694	0.040171329 R10
0.25	0.1	0.032473	0.045462061 R15
0.5	0.1	0.040022	0.056031245 R30
1	0.1	0.0492	0.068879338 R60
2	0.1	0.060356	0.084497712 R120
4	0.1	0.073917	0.103483692 R240
6	0.1	0.083168	0.116434821 R360
10	0.1	0.10	0.135004879 R600
24	0.1	0.124113	0.173757739 R1440