HR Wallingford
Working with water

conisbee Greenfield runoff estimation for sites

www.uksuds.com | Greenfield runoff tool

Calculated by:	
Site name:	Maria Fidelis School
Site location:	NW1 2HR

This is an estimation of the greenfield runoff rate limits that are needed to meet normal best practice criteria in line with Environment Agency guidance "Preliminary rainfall runoff management for developments", W5-074/A/TR1/1 rev. E (2012) and the SuDS Manual, C753 (Ciria, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Site coordinates

Latitude:	51.52785° N
Longitude:	0.13743° W

Reference:	
Date:	2019-04-04 10:02

Whole Site Greenfield Runoff Rate

Methodology	IH124

Site characteristics

Total site area (ha)	0.59

Methodology

Qbar estimation method	Calculate from SPR and SAAR
SPR estimation method	Calculate from SOIL type

	Default	Edited
SOIL type	4	4
HOST class	---	---
SPR/SPRHOST	0.47	0.47

Hydrological characteristics

	Default	Edited
SAAR (mm)	616	616
Hydrological region	6	6
Growth curve factor: 1 year	0.85	0.85
Growth curve factor: 30 year	2.3	2.3
Growth curve factor: 100 year	3.19	3.19

Notes:

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

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

Where flow rates are less than 5.0 l/s consents are usually set at 5.0l/s if blockage from vegetation and other materials is possible. Lower consent flow rates may be set in which case blockage work must be addressed by using appropriate drainage elements.

(3) Is SPR/SPRHOST ≤ 0.3?

Greenfield runoff rates

	Default	Edited
Qbar (l/s)	2.45	2.45
1 in 1 year (l/s)	2.08	2.08
1 in 30 years (l/s)	5.64	5.64
1 in 100 years (l/s)	7.82	7.82

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Calculated by:	
Site name:	Maria Fidelis School
Site location:	North Gower Street

This is an estimation of the greenfield runoff rate limits that are needed to meet normal best practice criteria in line with Environment Agency guidance "Preliminary rainfall runoff management for developments", W5-074/A/TR1/1 rev. E (2012) and the SuDS Manual, C753 (Ciria, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Site coordinates

Latitude:	51.52784° N
Longitude:	0.13746° W

Reference:	
Date:	2019-03-27 09:1'

Catchment 2 Greenfield Runoff Rate

Methodology	IH124

Site characteristics

Total site area (ha)	0.173

Methodology

Qbar estimation method	Calculate from SPR and SAAR
SPR estimation method	Calculate from SOIL type

	Default	Edited
SOIL type	4	4
HOST class	---	---
SPR/SPRHOST	0.47	0.47

Hydrological characteristics

	Default	Edited
SAAR (mm)	616	616
Hydrological region	6	6
Growth curve factor: 1 year	0.85	0.85
Growth curve factor: 30 year	2.3	2.3
Growth curve factor: 100 year	3.19	3.19

Notes:

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

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

Where flow rates are less than 5.0 l/s consents are usually set at 5.0l/s if blockage from vegetation and other materials is possible. Lower consent flow rates may be set in which case blockage work must be addressed by using appropriate drainage elements.

(3) Is SPR/SPRHOST ≤ 0.3?

Greenfield runoff rates

	Default	Edited
Qbar (l/s)	0.72	0.72
1 in 1 year (l/s)	0.61	0.61
1 in 30 years (l/s)	1.65	1.65
1 in 100 years (l/s)	2.29	2.29

Drainage Design Report

Flow+

v8.0

Network	Storm Network
Filename	W:\2018\600\180654\2 Calculation\1 WIP\2 Civil\1 Drainage\1 MicroDrainage\Maria Fidelis.pfd
Username	Sam Rice (sam.rice@conisbee.co.uk)
Last analysed	27/03/2019 15:45:45
Report produced on	28/03/2019 14:09:53

Causeway Sales

Tel:	+44(0) 1628 552000
Fax:	+44(0) 1628 552001
Email:	marketing@causeway.com
Web:	www.causeway.com

Technical support web portal:

http://support.causeway.com

Rainfall Methodology	FSR
Return Period (years)	100
Additional Flow (%)	40
FSR Region	England and Wales
M5-60 (mm)	20.000
Ratio-R	0.400
CV	1.000
Time of Entry (mins)	5.00
Maximum Time of Concentration (mins)	30.00
Maximum Rainfall (mm/hr)	50.0
Minimum Velocity (m/s)	1.00
Connection Type	Level Soffits
Minimum Backdrop Height (m)	0.200
Preferred Cover Depth (m)	1.200
Include Intermediate Ground	x
Enforce best practice design rules	✓

	Name	Area (ha)	T of E (mins)	Add Inflow (l/s)	Cover Level (m)	Node Type	Manhole Type	Diameter (mm)	Width (mm)	Easting (m)	Northing (m)	Depth (m)	Notes
✓	SWMH01	0.008	5.00		25.100	Manhole	Adoptable	600		529292.000	182644.573	1.300	
✓	SWMH02	0.017	5.00		25.100	Manhole	Adoptable	600		529298.906	182645.370	1.410	
✓	SWMH03	0.021	5.00		25.100	Manhole	Adoptable	600		529317.376	182645.831	1.600	
✓	SWMH08	0.063	5.00		25.080	Manhole	Adoptable	600		529331.273	182666.165	1.100	
✓	SWMH09	0.026	5.00		25.080	Manhole	Adoptable	600		529331.659	182649.441	1.280	
✓	SWMH10	0.009	5.00		25.100	Manhole	Adoptable	600		529317.830	182648.896	1.480	
✓	SWMH04	0.004	5.00		25.230	Manhole	Adoptable	600		529317.745	182632.341	2.085	
✓	SWMH12	0.008	5.00		25.150	Manhole	Adoptable	600		529310.721	182632.232	1.720	
✓	SWMH05				25.220	Manhole	Adoptable	600		529321.131	182632.392	2.165	
✓	SWMH06				25.220	Manhole	Adoptable	600		529330.064	182632.511	2.235	
✓	SWMH07				25.240	Manhole	Adoptable	1200		529331.092	182627.696	2.815	
✓	SWMH11	0.015	5.00		25.300	Manhole	Adoptable	600		529318.082	182620.501	1.830	
✓	SWMH13	0.002	5.00		25.250	Manhole	Adoptable	600		529318.256	182614.935	1.720	

	Name	US Node	DS Node	Length (m)	ks (mm) / n	Velocity Equation	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	Link Type	T of C (mins)	Rain (mm/hr)	Con Offset (m)	Min DS IL (m)	Lateral Area (ha)	Lateral Ins Point (%)	Lateral T of E (mins)
?	PIPE 1	SWMH01	SWMH02	6.952	0.600	Colebrook-White	23.800	23.690	0.110	63.2	100	Circular	5.12	50.0					
✓	PIPE 2	SWMH02	SWMH03	18.476	0.600	Colebrook-White	23.690	23.500	0.190	97.2	150	Circular	5.42	50.0					
✓	PIPE 3	SWMH03	SWMH04	13.495	0.600	Colebrook-White	23.500	23.360	0.140	96.4	225	Circular	5.59	50.0					
?	PIPE 4	SWMH08	SWMH09	16.728	0.600	Colebrook-White	23.980	23.800	0.180	92.9	225	Circular	5.21	50.0					
?	PIPE 5	SWMH09	SWMH10	13.840	0.600	Colebrook-White	23.800	23.620	0.180	76.9	225	Circular	5.36	50.0					
✓	PIPE 6	SWMH10	SWMH03	3.098	0.600	Colebrook-White	23.620	23.500	0.120	25.8	225	Circular	5.38	50.0					
?	PIPE 7	SWMH12	SWMH04	7.025	0.600	Colebrook-White	23.430	23.360	0.070	100.4	100	Circular	5.15	50.0					
✓	PIPE 8	SWMH04	SWMH05	3.386	0.600	Colebrook-White	23.145	23.055	0.090	37.6	225	Circular	5.62	50.0					
✓	PIPE 9	SWMH05	SWMH06	8.934	0.600	Colebrook-White	23.055	22.985	0.070	127.6	225	Circular	5.75	50.0					
?	PIPE 10	SWMH06	SWMH07	4.924	0.600	Colebrook-White	22.985	22.425	0.560	8.8	225	Circular	5.76	50.0					
?	PIPE 11	SWMH13	SWMH11	5.569	0.600	Colebrook-White	23.530	23.470	0.060	92.8	100	Circular	5.12	50.0					
✓	PIPE 12	SWMH11	SWMH04	11.845	0.600	Colebrook-White	23.470	23.270	0.200	59.2	100	Circular	5.31	50.0					

	Name	US Node	DS Node	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Minimum Depth (m)	Maximum Depth (m)	Z Area (ha)	Z Add Inflow (l/s)	Pre Depth (mm)	Pre Velocity (m/s)	Notes
?	PIPE 1	SWMH01	SWMH02	0.970	7.6	2.0	1.200	1.310	1.200	1.310	0.008	0.0	36	0.824	Velocity is less than the specified minimum
✓	PIPE 2	SWMH02	SWMH03	1.019	18.0	6.3	1.260	1.450	1.260	1.450	0.025	0.0	61	0.930	
✓	PIPE 3	SWMH03	SWMH04	1.332	52.9	36.4	1.375	1.645	1.375	1.645	0.144	0.0	138	1.433	
?	PIPE 4	SWMH08	SWMH05	1.356	53.9	15.9	0.875	1.055	0.875	1.055	0.063	0.0	84	1.187	Upstream Depth is less than the specified minimum | Downstream Depth is less than the specified minimum
?	PIPE 5	SWMH09	SWMH10	1.493	59.3	22.5	1.055	1.255	1.055	1.255	0.089	0.0	96	1.394	Upstream Depth is less than the specified minimum
✓	PIPE 6	SWMH10	SWMH03	2.585	102.8	24.8	1.255	1.375	1.255	1.375	0.098	0.0	75	2.140	
?	PIPE 7	SWMH12	SWMH04	0.767	6.0	2.0	1.620	1.770	1.620	1.770	0.008	0.0	40	0.694	Velocity is less than the specified minimum
✓	PIPE 8	SWMH04	SWMH05	2.139	85.0	43.8	1.860	1.940	1.860	1.940	0.173	0.0	115	2.156	
✓	PIPE 9	SWMH05	SWMH06	1.156	45.9	43.8	1.940	2.010	1.940	2.010	0.173	0.0	176	1.310	
?	PIPE 10	SWMH06	SWMH07	4.439	176.5	43.8	2.010	2.590	2.010	2.590	0.173	0.0	76	3.696	Velocity is more than 3 m/s | Downstream Depth is more than twice the specified minimum
?	PIPE 11	SWMH13	SWMH11	0.798	6.3	0.5	1.620	1.730	1.620	1.730	0.002	0.0	19	0.474	Velocity is less than the specified minimum
✓	PIPE 12	SWMH11	SWMH04	1.003	7.9	4.3	1.730	1.860	1.730	1.860	0.017	0.0	53	1.025	

Link Name	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)	US Node Name	Dia (mm)	Width (mm)	Node Type	MH Type	DS Node Name	Dia (mm)	Width (mm)	Node Type	MH Type
PIPE 1	6.952	63.2	100	Circular	25.100	23.800	1.200	25.100	23.69	1.310	SWMH01	600		Manhole	Adoptable	SWMH02	600		Manhole	Adoptable
PIPE 2	18.476	97.2	150	Circular	25.100	23.690	1.260	25.100	23.500	1.450	SWMH02	600		Manhole	Adoptable	SWMH03	600		Manhole	Adoptable
PIPE 3	13.495	98.4	225	Circular	25.100	23.500	1.375	25.230	23.360	1.645	SWMH03	600		Manhole	Adoptable	SWMH04	600		Manhole	Adoptable
PIPE 4	16.728	92.9	225	Circular	25.080	23.980	0.875	25.080	23.800	1.055	SWMH08	600		Manhole	Adoptable	SWMH09	600		Manhole	Adoptable
PIPE 5	13.940	76.9	225	Circular	25.080	23.800	1.055	25.100	23.620	1.255	SWMH09	600		Manhole	Adoptable	SWMH10	600		Manhole	Adoptable
PIPE 6	3.098	25.8	225	Circular	25.100	23.620	1.255	25.100	23.500	1.375	SWMH10	600		Manhole	Adoptable	SWMH03	600		Manhole	Adoptable
PIPE 7	7.025	100.4	100	Circular	25.150	23.430	1.620	25.230	23.360	1.770	SWMH12	600		Manhole	Adoptable	SWMH04	600		Manhole	Adoptable
PIPE 8	3.386	37.6	225	Circular	25.230	23.145	1.860	25.220	23.055	1.940	SWMH04	600		Manhole	Adoptable	SWMH05	600		Manhole	Adoptable
PIPE 9	8.934	127.6	225	Circular	25.220	23.055	1.940	25.220	22.985	2.010	SWMH05	600		Manhole	Adoptable	SWMH06	600		Manhole	Adoptable
PIPE 10	4.824	8.8	225	Circular	25.220	22.985	2.010	25.240	22.425	2.590	SWMH06	600		Manhole	Adoptable	SWMH07	1200		Manhole	Adoptable
PIPE 11	5.569	92.8	100	Circular	25.250	23.530	1.620	25.300	23.470	1.730	SWMH13	600		Manhole	Adoptable	SWMH11	600		Manhole	Adoptable
PIPE 12	11.845	59.2	100	Circular	25.300	23.470	1.730	25.230	23.270	1.860	SWMH11	600		Manhole	Adoptable	SWMH04	600		Manhole	Adoptable

Node Name	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Width (mm)	Node Type	MH Type		Link ID	IL (m)	Dia (mm)	Link Type
SWMH01	529292.000	182644.573	25.100	1.300	600		Manhole	Adoptable					
									0	PIPE 1	23.800	100	Circular
SWMH02	529298.906	182645.370	25.100	1.410	600		Manhole	Adoptable	1	PIPE 1	23.690	100	Circular
									0	PIPE 2	23.690	150	Circular
SWMH03	529317.376	182645.831	25.100	1.600	600		Manhole	Adoptable	1	PIPE 2	23.500	150	Circular
									2	PIPE 6	23.500	225	Circular
									0	PIPE 3	23.500	225	Circular
SWMH08	529331.273	182666.165	25.080	1.100	600		Manhole	Adoptable					
									0	PIPE 4	23.980	225	Circular
SWMH09	529331.659	182649.441	25.080	1.280	600		Manhole	Adoptable	1	PIPE 4	23.800	225	Circular
									0	PIPE 5	23.800	225	Circular
SWMH10	529317.830	182648.896	25.100	1.480	600		Manhole	Adoptable	1	PIPE 5	23.620	225	Circular
									0	PIPE 6	23.620	225	Circular
SWMH04	529317.745	182632.341	25.230	2.085	600		Manhole	Adoptable	1	PIPE 7	23.360	100	Circular
									2	PIPE 12	23.270	100	Circular
									3	PIPE 3	23.360	225	Circular
									0	PIPE 8	23.145	225	Circular
SWMH12	529310.721	182632.232	25.150	1.720	600		Manhole	Adoptable					

									0	PIPE 7	23.430	100	Circular
SWMH05	529321.131	182632.392	25.220	2.165	600		Manhole	Adoptable	1	PIPE 8	23.055	225	Circular
									0	PIPE 9	23.055	225	Circular
SWMH06	529330.064	182632.511	25.220	2.235	600		Manhole	Adoptable	1	PIPE 9	22.985	225	Circular
									0	PIPE 10	22.985	225	Circular
SWMH07	529331.092	182627.696	25.240	2.815	1200		Manhole	Adoptable	1	PIPE 10	22.425	225	Circular
SWMH11	529318.082	182620.501	25.300	1.830	600		Manhole	Adoptable	1	PIPE 11	23.470	100	Circular
									0	PIPE 12	23.470	100	Circular
SWMH13	529318.256	182614.935	25.250	1.720	600		Manhole	Adoptable					
									0	PIPE 11	23.530	100	Circular

Rainfall Methodology	FSR		Return Period (years)	Climate Change (%)
FSR Region	England and Wales		100	30
M5-60 (mm)	20.000			
Ratio-R	0.400			
Summer CV	1.000			
Winter CV	1.000			
Analysis Speed	Detailed			
Skip Steady State	x			
Drain Down Time (mins)	240			
Additional Storage (m³/ha)	20.0			
Storm Durations (mins)	30			
	60			
	120			
	180			
	240			
	360			
	480			
	600			
	720			
	960			
	1440			
Check Discharge Rate(s)	✓			
1 year (l/s)				
30 year (l/s)				
100 year (l/s)				
Check Discharge Volume	✓			
100 year 360 minute (m³)				

Site Makeup	Greenfield
Greenfield Method	IH124
Positively Drained Area (ha)	
SAAR (mm)	
Soil Index	1
SPR	0.10
Region	1
Growth Factor 1 year	0.85
Growth Factor 30 years	1.95
Growth Factor 100 years	2.48
Betterment (%)	0
QBar	
Q 1 year (l/s)	
Q 30 year (l/s)	
Q 100 year (l/s)	

Hydro-Brake®

Node	Flap Valve	Online / Offline	Downstream Link	Replaces Downstream Link	Loop to Node	Invert Level (m)	Design Depth (m)	Design Flow (l/s)	Objective	Sump Available	Product Number	Min Outlet Diameter (m)	Min Node Diameter (mm)
SWMH07	x	Online		✓		22.425	2.600	1.0	(HE) Minimise upstream storage	x	CTL-CHE-0036-1000-2600-1000	0.075	1200

Depth/Area/Inf Area

Node	Base Inf Coefficient (m/hr)	Side Inf Coefficient (m/hr)	Safety Factor	Porosity	Invert Level (m)	Time to half empty (mins)	Depth (m)	Area (m²)	Inf. Area (m²)
SWMH05	0.00000	0.00000	2.0	0.95	23.420		0.000	84.0	0.0
							1.200	84.0	0.0
							1.201	0.0	0.0
SWMH04	0.00000	0.00000	2.0	0.30	24.650	105	0.000	204.0	0.0
							0.250	204.0	0.0
							0.251	0.0	0.0

Default Values			Overrides					
Entry Loss (manhole)	0.250		Link	Entry Loss	Exit Loss		Node	Flood Risk (m)
Exit Loss (manhole)	0.250							
Entry Loss (junction)	0.000							
Exit Loss (junction)	0.000							
Flood Risk (m)	0.300							

Node Size	✓
Node Losses	✓
Link Size	✓
Minimum Diameter (mm)	150
Link Length	✓
Maximum Length (m)	100.000
Coordinates	✓
Accuracy (m)	1.000
Crossings	✓
Cover Depth	✓
Minimum Cover Depth (m)	
Maximum Cover Depth (m)	3.000
Backdrops	✓
Minimum Backdrop Height (m)	
Maximum Backdrop Height (m)	1.500
Full Bore Velocity	✓
Minimum Full Bore Velocity (m/s)	
Maximum Full Bore Velocity (m/s)	3.000
Proportional Velocity	✓
Return Period (years)	
Minimum Proportional Velocity (m/s)	0.750
Maximum Proportional Velocity (m/s)	3.000
Surcharged Depth	✓
Return Period (years)	
Maximum Surcharged Depth (m)	0.100
Flooding	✓
Return Period (years)	30
Discharge Rates	✓
1 year (l/s)	
30 year (l/s)	
100 year (l/s)	
Discharge Volume	✓

100 year 360 minute (m³)

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
100 year +30% 30 minute summer	297.655	84.226
100 year +30% 30 minute winter	208.881	84.226
100 year +30% 60 minute summer	199.275	52.662
100 year +30% 60 minute winter	132.393	52.662
100 year +30% 120 minute summer	120.330	31.800
100 year +30% 120 minute winter	79.945	31.800
100 year +30% 180 minute summer	90.748	23.353
100 year +30% 180 minute winter	58.989	23.353
100 year +30% 240 minute summer	70.550	18.644
100 year +30% 240 minute winter	46.872	18.644
100 year +30% 360 minute summer	52.629	13.543
100 year +30% 360 minute winter	34.210	13.543
100 year +30% 480 minute summer	40.838	10.792
100 year +30% 480 minute winter	27.132	10.792
100 year +30% 600 minute summer	33.061	9.043
100 year +30% 600 minute winter	22.589	9.043
100 year +30% 720 minute summer	29.188	7.823
100 year +30% 720 minute winter	19.616	7.823
100 year +30% 960 minute summer	23.616	6.219
100 year +30% 960 minute winter	15.643	6.219
100 year +30% 1440 minute summer	16.765	4.493
100 year +30% 1440 minute winter	11.267	4.493

Results for 100 year +30% Critical Storm Duration. Lowest mass balance: 84.62%

Event	US Node ID	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status	Link ID	DS Node ID	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
720 minute winter	SWMH01	705	24.843	1.043	0.4	0.4234	0.0000	FLOOD RISK	PIPE 1	SWMH02	0.3	0.324	0.045	0.0544	
720 minute winter	SWMH02	705	24.843	1.153	1.2	0.6041	0.0000	FLOOD RISK	PIPE 2	SWMH03	1.1	0.234	0.062	0.3253	
720 minute winter	SWMH03	705	24.843	1.343	7.1	0.7319	0.0000	FLOOD RISK	PIPE 3	SWMH04	7.0	0.571	0.133	0.5367	
30 minute summer	SWMH08	19	24.880	0.900	42.0	1.2848	0.0000	FLOOD RISK	PIPE 4	SWMH09	37.6	1.110	0.698	0.6653	
720 minute winter	SWMH09	705	24.843	1.043	4.7	0.7185	0.0000	FLOOD RISK	PIPE 5	SWMH10	4.5	0.824	0.076	0.5504	
720 minute winter	SWMH10	705	24.843	1.223	6.6	0.4940	0.0000	FLOOD RISK	PIPE 6	SWMH03	4.9	0.642	0.048	0.1232	
720 minute winter	SWMH04	705	24.843	1.698	8.3	12.3788	0.0000	SURCHARGED	PIPE 8	SWMH05	8.2	0.585	0.096	0.1347	
720 minute winter	SWMH12	705	24.843	1.413	0.4	0.5312	0.0000	SURCHARGED	PIPE 7	SWMH04	0.3	0.287	0.054	0.0550	
720 minute winter	SWMH05	705	24.843	1.788	8.2	96.3458	0.0000	SURCHARGED	PIPE 9	SWMH06	1.5	0.698	0.032	0.3553	
720 minute winter	SWMH06	705	24.843	1.858	2.1	0.5256	0.0000	SURCHARGED	PIPE 10	SWMH07	1.3	0.135	0.007	0.1958	
720 minute winter	SWMH07	705	24.843	2.418	1.3	2.7345	0.0000	OK	Hydro-Brake®		1.0				46.7
720 minute winter	SWMH11	705	24.843	1.373	0.8	0.6137	0.0000	SURCHARGED	PIPE 12	SWMH04	0.7	0.345	0.092	0.0927	
720 minute winter	SWMH13	705	24.843	1.313	0.1	0.4018	0.0000	SURCHARGED	PIPE 11	SWMH11	0.1	0.018	0.023	0.0436	

Adoptable						
Max Width (mm)	Diameter (mm)	Width (mm)		Max Depth (m)	Diameter (mm)	Width (mm)
374	1200			1.500	1050	
499	1350			99.999	1200	
749	1500					
900	1800					
>900	Link+900 mm					

Circular						
Shape	Circular		**Dia (mm)**			
Barrels	1		100			
Height (mm)			150			
Width (mm)						
Side Slope (1:X)						
Auto Increment (mm)	75					
Preferred Cover (m)						
Steep Slope (1:X)						
Follow Ground	x					
Velocity	Default					
ks (mm) / n						

APPENDIX H: SUDS MAINTENANCE STRATEGY

1.0 INTRODUCTION

The purpose of this document is to outline the proposed maintenance schedule for the drainage system and all SuDS features for the proposed development Maria Fidelis School.

The maintenance schedule set out here complies with the CIRIA SuDS Manual (C753), which is identified as providing current best practice in the industry. The report does not replace manufacturers' requirements and these should be followed for each product in addition to the information in this document.

For the proposed extents of SuDS features on a plan drawing, please refer to the separate drainage layout plans and drainage strategy report.

2.0 ORGANISATION RESPONSIBLE

The client, London Borough of Camden council (or appointed management company), will be responsible for undertaking maintenance of the proposed drainage for the whole life of the site.

3.0 CONVENTIONAL DRAINAGE SYSTEMS

3.1 Gullies, Silt Traps, Manholes, Catch pits & Pipework

On completion of construction, the internal surfaces of the sewers and manholes shall be thoroughly cleansed to remove all deleterious matter, without such matter being passed forward into the existing sewers.

All trapped gullies, silt traps, manholes and catch pits are to be regularly inspected every three months and cleared out on a regular frequency for the first nine months. After this period, the frequency can be reduced to every six months.

All drainage runs will be inspected once a year. The system is to be jetted clear if/when necessary.

3.2 Flow controls (including Hydrobrakes)

The manhole containing the flow control is to be regularly inspected once a year and any debris and silt are to be removed from the sump and manhole.

Hydrobrakes / vortex flow controls should be maintained in accordance with the manufacturer's requirements.

4.0 SUDS FEATURES

4.1 Introduction

The following SuDS measures are proposed for Maria Fidelis School:-

- Permeable Paving
- Below Ground Attenuation Tank

During the first year of the operation of all types of SuDS should be inspected at least monthly and after significant storm events to ensure that the system is functioning as designed and that no damage or faults are evident.

It is recommended that a report on the condition of the SuDS is undertaken further to an inspection at least once annually.

4.2 Permeable pavements

The pavement should be inspected regularly for clogging, litter, weeds and water ponding, preferably during and after heavy rainfall to check effective operation. Permeable pavements need to be regularly cleaned of silt and other sediments to preserve their infiltration capacity. The SuDS Manual indicates that sweeping once per year is sufficient for most sites, however the sweeping frequency should be adjusted to suit site specific conditions and should also be informed by annual inspection reports.

Care should be taken in adjusting vacuuming equipment to avoid removal of joining material. Any lost material should be replaced.

Table 1 outlines the proposed operation and maintenance regime for permeable pavements. This is adapted from The SuDS Manual (C753).

Table 1: Operation and maintenance requirements for permeable pavements

Maintenance Schedule	Required Action	Frequency
Regular maintenance	Brushing and vacuuming (standard cosmetic sweep over whole surface)	Once a year, after autumn leaf fall or reduced frequency as required, based on site- specification observations of clogging - pay particular attention to areas where water runs onto pervious surface from adjacent impermeable areas as this area is most likely to collect the most sediments
Occasional maintenance	Stabilise and mow contributing and advancement areas	As required
	Removal of weeds or management using glyphosphate applied directly into the weeds by an applicator rather than spraying	As required –once per year on less frequently used pavements
Remedial actions	Remediate any landscaping which through vegetation maintenance or soil slip, has been raised to within 50 mm of the level of the paving	As required
	Remedial work to any depressions rutting and cracked or broken blocks considered detrimental to the structural performance or a hazard to users, and replace lost jointing material	As required
	Rehabilitation of surface and upper structure by remedial sweeping.	Every 10 to 15 years or as required (if infiltration performance is reduced due to significant clogging)
Monitoring	Initial inspection	Monthly for three months after installation
	Inspect for evidence of poor operation and/or weed growth- if required, take remedial action	Three-monthly, 48h after large storms in first six months

	Inspect silt accumulation rates and establish appropriate brushing frequencies	Annually
	Monitor inspection chambers	Annually

4.3 Below ground attenuation tank

Regular maintenance and inspection of below ground attenuation tanks are required to ensure the effective long term operation of attenuation tanks. The main activity is associated with dealing with debris and silt.

Before connecting a newly constructed upstream drainage system to an attenuation tank, the new drainage system should be jetted and cleaned thoroughly.

Table 2 provides the proposed operation and maintenance regime for the attenuation tanks. This is adapted from The SuDS Manual (C753).

Table 2: Operation and maintenance requirements for below ground attenuation tank

Maintenance Schedule	**Required Action**	**Frequency**
Regular maintenance	Inspect and identify any areas that are not operating correctly. If required, take remedial action.	Monthly for 3 months, then annually.
	Remove debris from the catchment surface (where it may cause risks to performance)	Monthly
	For systems where rainfall infiltrates into the tank from above, check surface of filter for blockage by sediment, algae or other matter, remove and replace surface infiltration medium as necessary.	Annually
	Remove sediment from pre-treatment structures and/or internal forebays.	Annually, or as requested
Remedial actions	Repair/rehabilitate inlets, outlet, overflows and vents.	As required
Monitoring	Inspect/check all inlets, outlets, vents and overflows to ensure that they are in good condition and operating as designed.	Annually

	Survey inside of the tank for sediment build –up and remove if necessary	Every 5 years or as required

5.0 SUDS PROGRAMME

The proposed SuDS for the site will come on line approximately Autumn 2019.

The contractor should ensure that during the construction phase that SuDS are not damaged by construction works.

6.0 OPERATION AND MAINTENANCE MANUAL RECORDS

6.1 Documents to be handed over

Conisbee will provide this document to London Borough of Camden council, who will provide the document to the construction contractor, and London Borough of Camden will also include it in the Operation and Maintenance Manual.

London Borough of Camden council will have copies of the drainage design drawings which show locations of the proposed SuDS and any 'as-builts' provided by the contractor.

6.2 Maintenance Records

London Borough of Camden council will be provided with the standard proforma in Appendix B of The SuDS Manual to enable them to record the outcomes of inspections.

APPENDIX I: THAMES WATER PRE-DEVELOPMENT ENQUIRY RESPONSE

conisbee

Mr Jagdev Sehmi

CONISBEE
1-5 Offord Street,
London,
N1 1DH

Wastewater pre-planning
Our ref DS6055148

21 November 2018

Pre-planning enquiry: Capacity Confirmation

Dear Jagdev,

Thank you for providing information on your development.

Site: Maria Fields Convent School, North Gower Street, Kings Cross, London - NW1 2LY

Existing site: Senior School (450 pupils) + Sports hall (35 pupils).
Existing foul water discharge by gravity into sewer 1168x787mm, 1168x762mm & 1448x838mm.
Existing surface water discharge at 3.5 l/s at 1:1, 7.0 l/s for 1:10, 8.7 l/s for 1:30 & 11.3 l/s for 1:100yr into sewer 1168x762mm, 1448x838mm & 1168x786mm.
Proposed site: Sports hall (35 pupils) + Restaurant (70 no's) + Offices (1,550m2) + Classroom/Workshop (980m2).
Proposed foul water discharge by gravity into sewer 1168x787mm.
Proposed surface water flows at 2.3 l/s for all storm events up to and including 1:100yr into sewer 1168x762mm.

Foul Water

From the information you have provided, we can confirm that the existing **combined sewer** network does have sufficient capacity to accommodate the proposed foul water discharge from the proposed development.

This confirmation for capacity is valid for 12 months or for the life of any planning approval that this information is used to support, to a maximum of three years.

You'll need to keep us informed of any changes to your design – for example, an increase in the number or density of homes. Such changes could mean there is no longer sufficient capacity.

Surface Water

Please note that discharging surface water to the public sewer network should only be considered after all other methods of disposal have been investigated and proven to not be viable. In accordance with the Building Act 2000 Clause H3.3, positive connection to a public sewer will only be consented when it can be demonstrated that the hierarchy of disposal methods have been examined and proven to be impracticable. The disposal hierarchy being: 1st Soakaways; 2nd Watercourses; 3rd Sewers.

Only when it can be proven that soakage into the ground or a connection into the adjacent watercourse is not possible would we consider a restricted discharge into the public surface water sewer network.

We would encourage techniques such as green roofs and/or permeable paving that restricts surface water discharge from your site.

When redeveloping an existing site, policy 5.13 of the London Plan and Policy 3.4 of the Supplementary Planning Guidance (Sustainable Design And Construction) states that every attempt should be made to use flow attenuation and SUDS/storage to reduce the surface water discharge from the site as much as possible.

If they are consulted as part of any planning application, Thames Water Planning team would ask to see why it is not practicable to attenuate the flows to Greenfield run-off rates i.e. 5l/s/hectare of the total site area or if the site is less than hectare in size then the flows should be reduced by 95% of existing flows. Should the policy above be followed, we would envisage no capacity concerns with regards to surface water for this site.

Please note that the Local Planning authority may comment on surface water discharge under the planning process.

What happens next?

Please make sure you submit your connection application, giving us at least 21 days' notice of the date you wish to make your new connection/s.

If you've any further questions, please contact me on 020 3577 7608.

Yours sincerely

Zaid Kazi

Development Engineer
Developer Services – Sewer Adoptions Team