Title	Land at Sparlings Farm, Branston, CM6 1LP	Job No:	2401-08-C
Description :	Surface Water Calculations	By:	MEC
	Geocellular Storage Tank & Permeable Paving	Date:	Jan-24
		Sheet No:	1

Surface Water

Contributing Area (m^2) 3,510m^2 Or 0.351Ha
Plus an additional 10% Urban Creep allowance

Total Area Drained (m^2) **3,861m^2 Or 0.3861Ha**

Rainfall Data

M5-60 (mm) 20.00

Ratio R 0.400

Design Discharge Rate 1.0l/s (Essex County Council guidance requires discharge to be limited to 1:2year greenfield runoff rate or 1.0l/s, whichever is greater)

Achieved using a pumping station

Design Storm 100 Year

Climate Change Allowance +45%

Outfall location - Existing ditch network to the north-east of Development Site

Results

Provide Geocellular attenuation tank 18.0m(L) x 4.0m(W) x 3.6m(Deep).

Total storage provision in tank 246.24m^3 based on a 95% void ratio

All private drives and car parking constructed in Type C permeable paving (no infiltration). Discharge from each permeable area will be restricted using a 25mmØ orific plate prior to entering the Site drainage network

Refer to attached sheets

	2401-08-C Sparlings Farm Chelmsford Road, CM6 1LP SW Calcs 1:100yr +45%CC +10%UC
Date 26/01/2024 13:34 File 23.01 Pump.MDX	Designed by MEC Ltd Checked by MEC Ltd
Micro Drainage	Network 2017.1.2

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	100	PIMP (%)	100
M5-60 (mm)	20.000	Add Flow / Climate Change (%)	10
Ratio R	0.400	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	1.500
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.150	4-8	0.109	8-12	0.046	12-16	0.042	16-20	0.004

Total Area Contributing (ha) = 0.351

Total Pipe Volume (m³) = 9.451

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.000	2.000	0.010	200.0	0.041	15.00	0.0	0.600	o	150	Pipe/Conduit	
1.001	2.200	0.195	11.3	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
1.002	23.800	0.080	297.5	0.028	0.00	0.0	0.600	o	300	Pipe/Conduit	
2.000	2.000	0.020	100.0	0.000	15.00	0.0	0.600	o	150	Pipe/Conduit	
2.001	2.400	0.010	240.0	0.038	0.00	0.0	0.600	o	150	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	50.00	15.05	59.410	0.041	0.0	0.0	0.6	0.71	12.5	6.1
1.001	50.00	15.06	59.400	0.041	0.0	0.0	0.6	3.02	53.3	6.1
1.002	50.00	15.50	59.205	0.069	0.0	0.0	0.9	0.91	64.1	10.3
2.000	50.00	15.03	59.320	0.000	0.0	0.0	0.0	1.00	17.8	0.0
2.001	50.00	15.10	59.300	0.038	0.0	0.0	0.5	0.64	11.4	5.7

	2401-08-C Sparlings Farm Chelmsford Road, CM6 1LP SW Calcs 1:100yr +45%CC +10%UC
Date 26/01/2024 13:34 File 23.01 Pump.MDX	Designed by MEC Ltd Checked by MEC Ltd
Micro Drainage	Network 2017.1.2

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.003	32.000	0.105	304.8	0.028	0.00	0.0	0.600	o	300	Pipe/Conduit	
3.000	2.000	0.010	200.0	0.037	15.00	0.0	0.600	o	150	Pipe/Conduit	
3.001	2.600	0.130	20.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
3.002	16.500	0.165	100.0	0.028	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.004	31.700	0.105	301.9	0.028	0.00	0.0	0.600	o	300	Pipe/Conduit	
4.000	2.000	0.010	200.0	0.040	15.00	0.0	0.600	o	150	Pipe/Conduit	
4.001	4.400	0.045	97.8	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
1.005	20.800	0.070	297.1	0.028	0.00	0.0	0.600	o	300	Pipe/Conduit	
5.000	2.000	0.010	200.0	0.055	15.00	0.0	0.600	o	150	Pipe/Conduit	
5.001	2.900	0.030	96.7	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
1.006	5.000	0.050	100.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.007	5.000	0.050	100.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.003	50.00	16.09	59.125	0.135	0.0	0.0	1.8	0.90	63.3	20.1
3.000	50.00	15.05	61.360	0.037	0.0	0.0	0.5	0.71	12.5	5.5
3.001	50.00	15.07	61.350	0.037	0.0	0.0	0.5	2.26	40.0	5.5
3.002	50.00	15.28	59.415	0.065	0.0	0.0	0.9	1.31	52.0	9.7
1.004	50.00	16.68	59.020	0.228	0.0	0.0	3.1	0.90	63.6	34.0
4.000	50.00	15.05	61.010	0.040	0.0	0.0	0.5	0.71	12.5	6.0
4.001	50.00	15.12	61.000	0.040	0.0	0.0	0.5	1.02	18.0	6.0
1.005	50.00	17.06	58.550	0.296	0.0	0.0	4.0	0.91	64.1	44.1
5.000	50.00	15.05	60.310	0.055	0.0	0.0	0.7	0.71	12.5	8.2
5.001	50.00	15.09	60.300	0.055	0.0	0.0	0.7	1.02	18.1	8.2
1.006	50.00	17.12	56.515	0.351	0.0	0.0	4.8	1.57	111.1	52.3
1.007	50.00	17.17	56.465	0.351	0.0	0.0	4.8	1.57	111.1	52.3

	2401-08-C Sparlings Farm Chelmsford Road, CM6 1LP SW Calcs 1:100yr +45%CC +10%UC
Date 26/01/2024 13:35 File 23.01 Pump.MDX	Designed by MEC Ltd Checked by MEC Ltd
Micro Drainage	Network 2017.1.2

Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
Plot 4	60.200	0.790	Open Manhole	650 x 450	1.000	59.410	150				
OP4	60.200	0.800	Open Manhole	650 x 450	1.001	59.400	150	1.000	59.400	150	
SW1	60.300	1.095	Open Manhole	1200	1.002	59.205	300	1.001	59.205	150	
Plot 5	60.000	0.680	Open Manhole	650 x 450	2.000	59.320	150				
OP5	60.000	0.700	Open Manhole	650 x 450	2.001	59.300	150	2.000	59.300	150	
SW2	60.200	1.075	Open Manhole	1200	1.003	59.125	300	1.002	59.125	300	
								2.001	59.290	150	15
Plot 3	62.000	0.640	Open Manhole	1200	3.000	61.360	150				
OP3	62.000	0.650	Open Manhole	650 x 450	3.001	61.350	150	3.000	61.350	150	
SW3	62.000	2.585	Open Manhole	650 x 450	3.002	59.415	225	3.001	61.220	150	1730
SW4	61.900	2.880	Open Manhole	1200	1.004	59.020	300	1.003	59.020	300	
								3.002	59.250	225	155
Plot 2	61.750	0.740	Open Manhole	650 x 450	4.000	61.010	150				
OP2	61.750	0.750	Open Manhole	650 x 450	4.001	61.000	150	4.000	61.000	150	
SW5	61.550	3.000	Open Manhole		1.005	58.550	300	1.004	58.915	300	365
								4.001	60.955	150	2255
Plot 1	61.050	0.740	Open Manhole	650 x 450	5.000	60.310	150				
OP1	61.050	0.750	Open Manhole		5.001	60.300	150	5.000	60.300	150	
TANK	61.000	4.485	Junction	0	1.006	56.515	300	1.005	58.480	300	1965

	2401-08-C Sparlings Farm Chelmsford Road, CM6 1LP SW Calcs 1:100yr +45%CC +10%UC
Date 26/01/2024 13:35 File 23.01 Pump.MDX	Designed by MEC Ltd Checked by MEC Ltd
Micro Drainage	Network 2017.1.2

Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
								5.001	60.270	150	3605
PUMP	61.000	4.535	Open Manhole	1500	1.007	56.465	300	1.006	56.465	300	
	59.600	3.185	Open Manhole	0		OUTFALL		1.007	56.415	300	

	2401-08-C Sparlings Farm Chelmsford Road, CM6 1LP SW Calcs 1:100yr +45%CC +10%UC
Date 26/01/2024 13:34 File 23.01 Pump.MDX	Designed by MEC Ltd Checked by MEC Ltd
Micro Drainage	Network 2017.1.2

PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	o	150	Plot 4	60.200	59.410	0.640	Open Manhole	650 x 450
1.001	o	150	OP4	60.200	59.400	0.650	Open Manhole	650 x 450
1.002	o	300	SW1	60.300	59.205	0.795	Open Manhole	1200
2.000	o	150	Plot 5	60.000	59.320	0.530	Open Manhole	650 x 450
2.001	o	150	OP5	60.000	59.300	0.550	Open Manhole	650 x 450
1.003	o	300	SW2	60.200	59.125	0.775	Open Manhole	1200
3.000	o	150	Plot 3	62.000	61.360	0.490	Open Manhole	1200
3.001	o	150	OP3	62.000	61.350	0.500	Open Manhole	650 x 450
3.002	o	225	SW3	62.000	59.415	2.360	Open Manhole	650 x 450
1.004	o	300	SW4	61.900	59.020	2.580	Open Manhole	1200
4.000	o	150	Plot 2	61.750	61.010	0.590	Open Manhole	650 x 450
4.001	o	150	OP2	61.750	61.000	0.600	Open Manhole	650 x 450
1.005	o	300	SW5	61.550	58.550	2.700	Open Manhole	1200
5.000	o	150	Plot 1	61.050	60.310	0.590	Open Manhole	650 x 450

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	2.000	200.0	OP4	60.200	59.400	0.650	Open Manhole	650 x 450
1.001	2.200	11.3	SW1	60.300	59.205	0.945	Open Manhole	1200
1.002	23.800	297.5	SW2	60.200	59.125	0.775	Open Manhole	1200
2.000	2.000	100.0	OP5	60.000	59.300	0.550	Open Manhole	650 x 450
2.001	2.400	240.0	SW2	60.200	59.290	0.760	Open Manhole	1200
1.003	32.000	304.8	SW4	61.900	59.020	2.580	Open Manhole	1200
3.000	2.000	200.0	OP3	62.000	61.350	0.500	Open Manhole	650 x 450
3.001	2.600	20.0	SW3	62.000	61.220	0.630	Open Manhole	650 x 450
3.002	16.500	100.0	SW4	61.900	59.250	2.425	Open Manhole	1200
1.004	31.700	301.9	SW5	61.550	58.915	2.335	Open Manhole	1200
4.000	2.000	200.0	OP2	61.750	61.000	0.600	Open Manhole	650 x 450
4.001	4.400	97.8	SW5	61.550	60.955	0.445	Open Manhole	1200
1.005	20.800	297.1	TANK	61.000	58.480	2.220	Junction	
5.000	2.000	200.0	OP1	61.050	60.300	0.600	Open Manhole	650 x 450

	2401-08-C Sparlings Farm Chelmsford Road, CM6 1LP SW Calcs 1:100yr +45%CC +10%UC
Date 26/01/2024 13:34 File 23.01 Pump.MDX	Designed by MEC Ltd Checked by MEC Ltd
Micro Drainage	Network 2017.1.2

PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
5.001	o	150	OP1	61.050	60.300	0.600	Open Manhole	650 x 450
1.006	o	300	TANK	61.000	56.515	4.185	Junction	
1.007	o	300	PUMP	61.000	56.465	4.235	Open Manhole	1500

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
5.001	2.900	96.7	TANK	61.000	60.270	0.580	Junction	
1.006	5.000	100.0	PUMP	61.000	56.465	4.235	Open Manhole	1500
1.007	5.000	100.0		59.600	56.415	2.885	Open Manhole	0

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.007		59.600	56.415	0.000	0	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	10.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	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	6
Number of Online Controls	6	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)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Storm Duration (mins)	30
Ratio R	0.400		

	2401-08-C Sparlings Farm Chelmsford Road, CM6 1LP SW Calcs 1:100yr +45%CC +10%UC	
Date 26/01/2024 13:34 File 23.01 Pump.MDX	Designed by MEC Ltd Checked by MEC Ltd	
Micro Drainage	Network 2017.1.2	

Online Controls for Storm

Orifice Manhole: OP4, DS/PN: 1.001, Volume (m³): 0.3

Diameter (m) 0.025 Discharge Coefficient 0.600 Invert Level (m) 59.400

Orifice Manhole: OP5, DS/PN: 2.001, Volume (m³): 0.2

Diameter (m) 0.025 Discharge Coefficient 0.600 Invert Level (m) 59.300

Orifice Manhole: OP3, DS/PN: 3.001, Volume (m³): 0.2

Diameter (m) 0.025 Discharge Coefficient 0.600 Invert Level (m) 61.350

Orifice Manhole: OP2, DS/PN: 4.001, Volume (m³): 0.2

Diameter (m) 0.024 Discharge Coefficient 0.600 Invert Level (m) 61.000

Orifice Manhole: OP1, DS/PN: 5.001, Volume (m³): 0.2

Diameter (m) 0.024 Discharge Coefficient 0.600 Invert Level (m) 60.300

Pump Manhole: PUMP, DS/PN: 1.007, Volume (m³): 8.3

Invert Level (m) 56.465

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.200	1.0000	1.800	1.0000	3.400	1.0000	5.000	0.0000
0.400	1.0000	2.000	1.0000	3.401	0.0000	5.200	0.0000
0.600	1.0000	2.200	1.0000	3.800	0.0000	5.400	0.0000
0.800	1.0000	2.400	1.0000	3.801	0.0000	5.600	0.0000
1.000	1.0000	2.600	1.0000	4.200	0.0000	5.800	0.0000
1.200	1.0000	2.800	1.0000	4.400	0.0000	6.000	0.0000
1.400	1.0000	3.000	1.0000	4.600	0.0000		
1.600	1.0000	3.001	1.0000	4.800	0.0000		

	2401-08-C Sparlings Farm Chelmsford Road, CM6 1LP SW Calcs 1:100yr +45%CC +10%UC	Micro Drainage
Date 26/01/2024 13:34 File 23.01 Pump.MDX	Designed by MEC Ltd Checked by MEC Ltd	
Micro Drainage	Network 2017.1.2	

Storage Structures for Storm

Porous Car Park Manhole: OP4, DS/PN: 1.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	10.0
Membrane Percolation (mm/hr)	1000	Length (m)	18.0
Max Percolation (l/s)	50.0	Slope (1:X)	100.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	59.400	Cap Volume Depth (m)	0.600

Porous Car Park Manhole: OP5, DS/PN: 2.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	10.0
Membrane Percolation (mm/hr)	1000	Length (m)	18.0
Max Percolation (l/s)	50.0	Slope (1:X)	100.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	59.300	Cap Volume Depth (m)	0.500

Porous Car Park Manhole: OP3, DS/PN: 3.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	10.0
Membrane Percolation (mm/hr)	1000	Length (m)	21.0
Max Percolation (l/s)	58.3	Slope (1:X)	80.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	61.350	Cap Volume Depth (m)	0.450

Porous Car Park Manhole: OP2, DS/PN: 4.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	10.0
Membrane Percolation (mm/hr)	1000	Length (m)	20.0
Max Percolation (l/s)	55.6	Slope (1:X)	100.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	61.000	Cap Volume Depth (m)	0.550

Porous Car Park Manhole: OP1, DS/PN: 5.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	10.0
Membrane Percolation (mm/hr)	1000	Length (m)	35.5
Max Percolation (l/s)	98.6	Slope (1:X)	100.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	60.300	Cap Volume Depth (m)	0.550

Cellular Storage Manhole: TANK, DS/PN: 1.006

Invert Level (m)	56.525	Infiltration Coefficient Side (m/hr)	0.00000
Infiltration Coefficient Base (m/hr)	0.00000	Safety Factor	2.0

	2401-08-C Sparlings Farm Chelmsford Road, CM6 1LP SW Calcs 1:100yr +45%CC +10%UC	
Date 26/01/2024 13:34 File 23.01 Pump.MDX	Designed by MEC Ltd Checked by MEC Ltd	
Micro Drainage	Network 2017.1.2	

Cellular Storage Manhole: TANK, DS/PN: 1.006

Porosity 0.95

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	72.0	72.0	3.401	0.0	221.6
3.400	72.0	221.6			

	2401-08-C Sparlings Farm Chelmsford Road, CM6 1LP SW Calcs 1:100yr +45%CC +10%UC	
Date 26/01/2024 13:34 File 23.01 Pump.MDX	Designed by MEC Ltd Checked by MEC Ltd	
Micro Drainage	Network 2017.1.2	

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	10.000
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	6
Number of Online Controls	6	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.400
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	20.000	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	ON
DVD Status	OFF
Inertia Status	OFF

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 45

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	Plot 4	120 Winter	1	+0%	30/15 Summer				59.552
1.001	OP4	120 Winter	1	+0%	1/120 Winter				59.552
1.002	SW1	15 Winter	1	+0%	100/480 Winter				59.257
2.000	Plot 5	120 Winter	1	+0%	30/15 Winter				59.434
2.001	OP5	120 Winter	1	+0%	30/15 Summer				59.434
1.003	SW2	15 Winter	1	+0%	100/480 Winter				59.197
3.000	Plot 3	120 Winter	1	+0%	30/15 Summer				61.503
3.001	OP3	120 Winter	1	+0%	1/60 Winter				61.502
3.002	SW3	15 Winter	1	+0%	100/960 Winter				59.459
1.004	SW4	15 Winter	1	+0%	100/15 Summer				59.122
4.000	Plot 2	120 Winter	1	+0%	30/15 Summer				61.152
4.001	OP2	120 Winter	1	+0%	1/120 Winter				61.151
1.005	SW5	15 Winter	1	+0%	100/15 Summer				58.668
5.000	Plot 1	120 Winter	1	+0%	1/30 Winter				60.485
5.001	OP1	120 Winter	1	+0%	1/30 Summer				60.485
1.006	TANK	480 Winter	1	+0%	1/60 Winter				57.205
1.007	PUMP	480 Winter	1	+0%	1/60 Summer				57.253

	2401-08-C Sparlings Farm Chelmsford Road, CM6 1LP SW Calcs 1:100yr +45%CC +10%UC	
Date 26/01/2024 13:34 File 23.01 Pump.MDX	Designed by MEC Ltd Checked by MEC Ltd	
Micro Drainage	Network 2017.1.2	

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	Plot 4	-0.008	0.000	0.18		1.9	OK	
1.001	OP4	0.002	0.000	0.02		0.5	SURCHARGED	
1.002	SW1	-0.248	0.000	0.07		3.9	OK	
2.000	Plot 5	-0.036	0.000	0.00		0.0	OK	
2.001	OP5	-0.016	0.000	0.04		0.5	OK	
1.003	SW2	-0.228	0.000	0.13		7.5	OK	
3.000	Plot 3	-0.007	0.000	0.16		1.7	OK	
3.001	OP3	0.002	0.000	0.02		0.5	SURCHARGED	
3.002	SW3	-0.181	0.000	0.08		3.9	OK	
1.004	SW4	-0.198	0.000	0.25		14.7	OK	
4.000	Plot 2	-0.008	0.000	0.17		1.9	OK	
4.001	OP2	0.001	0.000	0.03		0.4	SURCHARGED	
1.005	SW5	-0.182	0.000	0.32		18.2	OK	
5.000	Plot 1	0.025	0.000	0.24		2.6	SURCHARGED	
5.001	OP1	0.035	0.000	0.05		0.5	SURCHARGED	
1.006	TANK	0.390	0.000	0.06		3.5	SURCHARGED*	
1.007	PUMP	0.488	0.000	0.02		1.0	SURCHARGED	

	2401-08-C Sparlings Farm Chelmsford Road, CM6 1LP SW Calcs 1:100yr +45%CC +10%UC	
Date 26/01/2024 13:34 File 23.01 Pump.MDX	Designed by MEC Ltd Checked by MEC Ltd	
Micro Drainage	Network 2017.1.2	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	10.000
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	6
Number of Online Controls	6	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.400
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	20.000	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	ON
DVD Status	OFF
Inertia Status	OFF

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 45

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	Plot 4	120 Winter	30	+0%	30/15 Summer				59.678
1.001	OP4	120 Winter	30	+0%	1/120 Winter				59.678
1.002	SW1	15 Winter	30	+0%	100/480 Winter				59.306
2.000	Plot 5	120 Winter	30	+0%	30/15 Winter				59.552
2.001	OP5	120 Winter	30	+0%	30/15 Summer				59.552
1.003	SW2	15 Winter	30	+0%	100/480 Winter				59.265
3.000	Plot 3	120 Winter	30	+0%	30/15 Summer				61.618
3.001	OP3	120 Winter	30	+0%	1/60 Winter				61.617
3.002	SW3	15 Winter	30	+0%	100/960 Winter				59.491
1.004	SW4	15 Winter	30	+0%	100/15 Summer				59.214
4.000	Plot 2	120 Winter	30	+0%	30/15 Summer				61.269
4.001	OP2	120 Winter	30	+0%	1/120 Winter				61.268
1.005	SW5	15 Winter	30	+0%	100/15 Summer				58.780
5.000	Plot 1	240 Winter	30	+0%	1/30 Winter				60.615
5.001	OP1	240 Winter	30	+0%	1/30 Summer				60.614
1.006	TANK	960 Winter	30	+0%	1/60 Winter				58.400
1.007	PUMP	960 Winter	30	+0%	1/60 Summer				58.448

	2401-08-C Sparlings Farm Chelmsford Road, CM6 1LP SW Calcs 1:100yr +45%CC +10%UC	
Date 26/01/2024 13:34 File 23.01 Pump.MDX	Designed by MEC Ltd Checked by MEC Ltd	
Micro Drainage	Network 2017.1.2	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	Plot 4	0.118	0.000	0.42		4.6	SURCHARGED	
1.001	OP4	0.128	0.000	0.02		0.7	SURCHARGED	
1.002	SW1	-0.199	0.000	0.20		11.4	OK	
2.000	Plot 5	0.082	0.000	0.00		0.0	SURCHARGED	
2.001	OP5	0.102	0.000	0.06		0.6	SURCHARGED	
1.003	SW2	-0.160	0.000	0.38		21.8	OK	
3.000	Plot 3	0.108	0.000	0.37		4.0	SURCHARGED	
3.001	OP3	0.117	0.000	0.03		0.7	SURCHARGED	
3.002	SW3	-0.149	0.000	0.25		11.6	OK	
1.004	SW4	-0.106	0.000	0.74		42.7	OK	
4.000	Plot 2	0.109	0.000	0.41		4.5	SURCHARGED	
4.001	OP2	0.118	0.000	0.05		0.6	SURCHARGED	
1.005	SW5	-0.070	0.000	0.93		52.1	OK	
5.000	Plot 1	0.155	0.000	0.35		3.8	SURCHARGED	
5.001	OP1	0.164	0.000	0.06		0.7	SURCHARGED	
1.006	TANK	1.585	0.000	0.06		3.6	SURCHARGED*	
1.007	PUMP	1.683	0.000	0.02		1.0	SURCHARGED	

	2401-08-C Sparlings Farm Chelmsford Road, CM6 1LP SW Calcs 1:100yr +45%CC +10%UC	
Date 26/01/2024 13:34 File 23.01 Pump.MDX	Designed by MEC Ltd Checked by MEC Ltd	
Micro Drainage	Network 2017.1.2	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	10.000
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	6
Number of Online Controls	6	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model		FSR	Ratio R 0.400
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	20.000	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	ON
DVD Status	OFF
Inertia Status	OFF

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 45

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
1.000	Plot 4	1440 Winter	100	+45%	30/15 Summer			
1.001	OP4	1440 Winter	100	+45%	1/120 Winter			
1.002	SW1	1440 Winter	100	+45%	100/480 Winter			
2.000	Plot 5	1440 Winter	100	+45%	30/15 Winter			
2.001	OP5	1440 Winter	100	+45%	30/15 Summer			
1.003	SW2	1440 Winter	100	+45%	100/480 Winter			
3.000	Plot 3	240 Winter	100	+45%	30/15 Summer			
3.001	OP3	240 Winter	100	+45%	1/60 Winter			
3.002	SW3	1440 Winter	100	+45%	100/960 Winter			
1.004	SW4	1440 Winter	100	+45%	100/15 Summer			
4.000	Plot 2	240 Winter	100	+45%	30/15 Summer			
4.001	OP2	240 Winter	100	+45%	1/120 Winter			
1.005	SW5	1440 Winter	100	+45%	100/15 Summer			
5.000	Plot 1	240 Winter	100	+45%	1/30 Winter			
5.001	OP1	240 Winter	100	+45%	1/30 Summer			
1.006	TANK	1440 Winter	100	+45%	1/60 Winter			
1.007	PUMP	1440 Winter	100	+45%	1/60 Summer			

	2401-08-C Sparlings Farm Chelmsford Road, CM6 1LP SW Calcs 1:100yr +45%CC +10%UC	
Date 26/01/2024 13:34 File 23.01 Pump.MDX	Designed by MEC Ltd Checked by MEC Ltd	
Micro Drainage	Network 2017.1.2	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	Plot 4	59.907	0.347	0.000	0.12		1.3	FLOOD RISK	
1.001	OP4	59.907	0.357	0.000	0.03		0.7	FLOOD RISK	
1.002	SW1	59.922	0.417	0.000	0.03		1.6	SURCHARGED	
2.000	Plot 5	59.911	0.441	0.000	0.00		0.0	FLOOD RISK	
2.001	OP5	59.911	0.461	0.000	0.06		0.7	FLOOD RISK	
1.003	SW2	59.923	0.498	0.000	0.05		3.1	FLOOD RISK	
3.000	Plot 3	61.779	0.269	0.000	0.44		4.7	FLOOD RISK	
3.001	OP3	61.778	0.278	0.000	0.04		0.8	FLOOD RISK	
3.002	SW3	59.924	0.284	0.000	0.03		1.5	SURCHARGED	
1.004	SW4	59.924	0.604	0.000	0.10		5.5	SURCHARGED	
4.000	Plot 2	61.464	0.304	0.000	0.48		5.2	FLOOD RISK	
4.001	OP2	61.463	0.313	0.000	0.06		0.8	FLOOD RISK	
1.005	SW5	59.926	1.076	0.000	0.13		7.0	SURCHARGED	
5.000	Plot 1	60.783	0.323	0.000	0.66		7.2	FLOOD RISK	
5.001	OP1	60.783	0.333	0.000	0.08		0.8	FLOOD RISK	
1.006	TANK	59.926	3.111	0.000	0.14		8.8	SURCHARGED*	
1.007	PUMP	59.975	3.210	0.000	0.02		1.0	SURCHARGED	

hrwallingford

Greenfield runoff rate estimation for sites

www.uksuds.com | Greenfield runoff tool

Please choose a more secure password. It should be longer than 8 characters, unique to you and difficult for others to guess.

Registration successful. You are now logged in.

Calculated by: James Maddin

Site name: SPARLINGS FARM

Site location: CHELMSFORD ROAD

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: 51.85652° N

Longitude: 0.38445° E

Reference: 1659792692

Date: Jan 20 2024 21:03

Runoff estimation approach

IH124

Site characteristics

Total site area (ha): 0.3732

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):	585	585
Hydrological region:	6	6
Growth curve factor 1 year:	0.85	0.85
Growth curve factor 30 years:	2.3	2.3

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 ≤ 0.3?

Growth curve factor 100 years:	3.19	3.19
Growth curve factor 200 years:	3.74	3.74

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):	0.87	0.87
1 in 1 year (l/s):	0.74	0.74
1 in 30 years (l/s):	2	2
1 in 100 year (l/s):	2.77	2.77
1 in 200 years (l/s):	3.25	3.25