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Woodcote Grove Ashley Road Epsom Surrey KT18 5BW		
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Micro Drainage Network W.12.6

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)	2	Add Flow / Climate Change (%)	0
M5-60 (mm)	19.000	Minimum Backdrop Height (m)	0.000
Ratio R	0.400	Maximum Backdrop Height (m)	5.000
Maximum Rainfall (mm/hr)	50	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.00	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	1.000	Min Slope for Optimisation (1:X)	1000
PIMP (%)	100		


Designed with Level Soffits

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)
1.000	71.862	5.881	12.2	0.064	5.00	0.0	0.600	o	225
2.000	65.648	0.821	80.0	0.337	5.00	0.0	0.600	o	300
1.001	35.930	0.120	300.0	0.192	0.00	0.0	0.600	o	375
1.002	29.958	0.100	300.0	0.015	0.00	0.0	0.600	o	375
3.000	45.530	2.277	20.0	0.071	5.00	0.0	0.600	o	225
4.000	62.151	1.776	35.0	0.306	5.00	0.0	0.600	o	225
3.001	30.485	1.016	30.0	0.000	0.00	0.0	0.600	o	225

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	5.32	112.210	0.064	0.0	0.0	0.0	3.76	149.7	11.6
2.000	50.00	5.62	107.000	0.337	0.0	0.0	0.0	1.76	124.4	60.8
1.001	50.00	6.20	106.104	0.593	0.0	0.0	0.0	1.04	115.0	107.1
1.002	50.00	6.68	105.984	0.608	0.0	0.0	0.0	1.04	115.0	109.8
3.000	50.00	5.26	112.380	0.071	0.0	0.0	0.0	2.94	116.9	12.8
4.000	50.00	5.47	111.805	0.306	0.0	0.0	0.0	2.22	88.2	55.2
3.001	50.00	5.68	110.029	0.377	0.0	0.0	0.0	2.40	95.3	68.1

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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)
1.003	23.791	0.079	300.0	0.095	0.00	0.0	0.600	o	525
1.004	24.000	0.048	500.0	0.102	0.00	0.0	0.600	o	525
5.000	46.900	0.586	80.0	0.238	5.00	0.0	0.600	o	225
1.005	48.234	0.965	50.0	0.000	0.00	0.0	0.600	o	525
6.000	46.766	0.585	79.9	0.352	5.00	0.0	0.600	o	300
7.000	63.682	1.061	60.0	0.135	5.00	0.0	0.600	o	225
6.001	63.827	0.160	400.0	0.291	0.00	0.0	0.600	o	450
1.006	27.289	0.039	700.0	0.143	0.00	0.0	0.600	o	750
1.007	26.890	0.038	700.0	0.167	0.00	0.0	0.600	o	750
1.008	18.875	0.094	200.0	0.061	0.00	0.0	0.600	o	750

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	6.98	105.734	1.080	0.0	0.0	0.0	1.29	278.8	195.0
1.004	50.00	7.39	105.655	1.182	0.0	0.0	0.0	0.99	215.4	213.4
5.000	50.00	5.53	108.025	0.238	0.0	0.0	0.0	1.46	58.2	43.0
1.005	50.00	7.64	105.607	1.420	0.0	0.0	0.0	3.17	686.9	256.4
6.000	50.00	5.44	104.480	0.352	0.0	0.0	0.0	1.76	124.4	63.6
7.000	50.00	5.63	105.695	0.135	0.0	0.0	0.0	1.69	67.3	24.4
6.001	50.00	6.68	103.745	0.778	0.0	0.0	0.0	1.01	160.7	140.5
1.006	50.00	8.07	103.285	2.341	0.0	0.0	0.0	1.05	463.9	422.7
1.007	50.00	8.50	103.246	2.508	0.0	0.0	0.0	1.05	463.9	452.8
1.008	50.00	8.66	103.208	2.569	0.0	0.0	0.0	1.98	872.6	463.8

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Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdrop (mm)
1	113.560	1.350	Open Manhole	1050	1.000	112.210	225				
2	108.500	1.500	Open Manhole	1050	2.000	107.000	300				
3	108.410	2.306	Open Manhole	1350	1.001	106.104	375	1.000	106.329	225	75
								2.000	106.179	300	
4	109.200	3.216	Open Manhole	1350	1.002	105.984	375	1.001	105.984	375	
5	113.730	1.350	Open Manhole	1050	3.000	112.380	225				
6	113.230	1.425	Open Manhole	1050	4.000	111.805	225				
7	111.600	1.571	Open Manhole	1050	3.001	110.029	225	3.000	110.104	225	74
								4.000	110.029	225	
8	110.460	4.726	Open Manhole	1500	1.003	105.734	525	1.002	105.884	375	
								3.001	109.013	225	2979
9	109.650	3.995	Open Manhole	1500	1.004	105.655	525	1.003	105.655	525	
10	109.450	1.425	Open Manhole	1050	5.000	108.025	225				
11	109.050	3.443	Open Manhole	1500	1.005	105.607	525	1.004	105.607	525	
								5.000	107.439	225	1532
12	105.980	1.500	Open Manhole	1050	6.000	104.480	300				
13	107.120	1.425	Open Manhole	1050	7.000	105.695	225				
14	106.120	2.375	Open Manhole	1350	6.001	103.745	450	6.000	103.895	300	
								7.000	104.634	225	664
15	106.660	3.375	Open Manhole	1800	1.006	103.285	750	1.005	104.642	525	1132
								6.001	103.585	450	
16	106.580	3.334	Open Manhole	1800	1.007	103.246	750	1.006	103.246	750	
17	106.170	2.962	Open Manhole	1800	1.008	103.208	750	1.007	103.208	750	
	104.000	0.886	Open Manhole	0		OUTFALL		1.008	103.114	750	

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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	225	1	113.560	112.210	1.125	Open Manhole	1050
2.000	o	300	2	108.500	107.000	1.200	Open Manhole	1050
1.001	o	375	3	108.410	106.104	1.931	Open Manhole	1350
1.002	o	375	4	109.200	105.984	2.841	Open Manhole	1350
3.000	o	225	5	113.730	112.380	1.125	Open Manhole	1050
4.000	o	225	6	113.230	111.805	1.200	Open Manhole	1050
3.001	o	225	7	111.600	110.029	1.346	Open Manhole	1050
1.003	o	525	8	110.460	105.734	4.201	Open Manhole	1500
1.004	o	525	9	109.650	105.655	3.470	Open Manhole	1500
5.000	o	225	10	109.450	108.025	1.200	Open Manhole	1050
1.005	o	525	11	109.050	105.607	2.918	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)
1.000	71.862	12.2	3	108.410	106.329	1.856	Open Manhole	1350
2.000	65.648	80.0	3	108.410	106.179	1.931	Open Manhole	1350
1.001	35.930	300.0	4	109.200	105.984	2.841	Open Manhole	1350
1.002	29.958	300.0	8	110.460	105.884	4.201	Open Manhole	1500
3.000	45.530	20.0	7	111.600	110.104	1.272	Open Manhole	1050
4.000	62.151	35.0	7	111.600	110.029	1.346	Open Manhole	1050
3.001	30.485	30.0	8	110.460	109.013	1.222	Open Manhole	1500
1.003	23.791	300.0	9	109.650	105.655	3.470	Open Manhole	1500
1.004	24.000	500.0	11	109.050	105.607	2.918	Open Manhole	1500
5.000	46.900	80.0	11	109.050	107.439	1.386	Open Manhole	1500
1.005	48.234	50.0	15	106.660	104.642	1.493	Open Manhole	1800

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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)
6.000	o	300	12	105.980	104.480	1.200	Open Manhole	1050
7.000	o	225	13	107.120	105.695	1.200	Open Manhole	1050
6.001	o	450	14	106.120	103.745	1.925	Open Manhole	1350
1.006	o	750	15	106.660	103.285	2.625	Open Manhole	1800
1.007	o	750	16	106.580	103.246	2.584	Open Manhole	1800
1.008	o	750	17	106.170	103.208	2.212	Open Manhole	1800

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)
6.000	46.766	79.9	14	106.120	103.895	1.925	Open Manhole	1350
7.000	63.682	60.0	14	106.120	104.634	1.261	Open Manhole	1350
6.001	63.827	400.0	15	106.660	103.585	2.625	Open Manhole	1800
1.006	27.289	700.0	16	106.580	103.246	2.584	Open Manhole	1800
1.007	26.890	700.0	17	106.170	103.208	2.212	Open Manhole	1800
1.008	18.875	200.0		104.000	103.114	0.136	Open Manhole	0

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

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, 180, 240, 360, 480, 600,
 720, 960, 1440, 2160, 2880, 4320, 5760, 7200,
 8640, 10080
 Return Period(s) (years) 2, 30, 100
 Climate Change (%) 0, 0, 20

PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
1.000	15 Winter	30	0%					
2.000	15 Winter	30	0%	30/15 Summer	100/15 Summer			2
1.001	15 Winter	30	0%	30/15 Summer				
1.002	15 Winter	30	0%	30/15 Summer				
3.000	15 Winter	30	0%					
4.000	15 Winter	30	0%	30/15 Summer	100/15 Summer			4
3.001	15 Winter	30	0%	30/15 Summer				
1.003	15 Winter	30	0%	30/15 Summer				
1.004	15 Winter	30	0%	30/15 Summer				
5.000	15 Winter	30	0%	30/15 Summer	100/15 Winter			1
1.005	15 Winter	30	0%					
6.000	15 Winter	30	0%	30/15 Summer	100/15 Summer			2
7.000	15 Winter	30	0%	100/15 Summer				
6.001	15 Winter	30	0%	30/15 Summer				
1.006	15 Winter	30	0%	30/15 Summer				
1.007	15 Winter	30	0%	30/15 Summer				
1.008	15 Winter	30	0%	30/15 Winter				

PN	US/MH Name	Water Level (m)	Flooded Surch'd Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
1.000	1	112.267	-0.168	0.000	0.14	0.0	20.5	OK
2.000	2	107.490	0.190	0.000	0.79	0.0	94.2	SURCHARGED
1.001	3	106.961	0.482	0.000	1.54	0.0	159.5	SURCHARGED
1.002	4	106.669	0.310	0.000	1.59	0.0	161.1	SURCHARGED
3.000	5	112.449	-0.156	0.000	0.21	0.0	23.0	OK
4.000	6	112.349	0.319	0.000	0.98	0.0	83.9	SURCHARGED
3.001	7	110.607	0.353	0.000	1.16	0.0	103.7	SURCHARGED
1.003	8	106.414	0.155	0.000	1.27	0.0	285.1	SURCHARGED
1.004	9	106.272	0.092	0.000	1.79	0.0	305.1	SURCHARGED
5.000	10	108.594	0.344	0.000	1.26	0.0	69.9	SURCHARGED
1.005	11	105.905	-0.227	0.000	0.61	0.0	373.1	OK
6.000	12	104.984	0.204	0.000	0.87	0.0	101.6	SURCHARGED
7.000	13	105.831	-0.089	0.000	0.67	0.0	43.6	OK
6.001	14	104.527	0.332	0.000	1.44	0.0	214.7	SURCHARGED

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

PN	US/MH Name	Water	Surch'd	Flooded	Flow /	O'flow	Pipe	Status
		Level (m)	Depth (m)	Volume (m³)	Cap.	(l/s)	Flow (l/s)	
1.006	15	104.245	0.209	0.000	1.95	0.0	606.3	SURCHARGED
1.007	16	104.110	0.114	0.000	2.04	0.0	628.5	SURCHARGED
1.008	17	103.977	0.019	0.000	1.01	0.0	613.9	SURCHARGED