

Rogers Cory Partnership							Page 18	
The Old School Old School Road Hook Hampshire RG27 9NJ								
Date 02.02.2021				Designed by Tim K				
File SW1-STRAT SEPARATE.MDX				Checked by Terry S				
Innovyze				Network 2014.1.1				
<u>30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)</u> <u>for Storm - Net 1</u>								
PN	US/MH Name	Water Level (m)	Surch'd Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
1.007	8	5.581	0.000	0.000	0.95	0.0	94.8	OK
2.000	22	5.631	0.000	0.000	0.10	0.0	25.1	OK
1.008	9	5.551	0.000	0.000	0.36	0.0	86.6	OK
3.000	23	5.538	0.000	0.000	0.39	0.0	92.4	OK
1.009	10	5.508	0.034	0.000	1.18	0.0	161.5	SURCHARGED
4.000	24	5.485	-0.040	0.000	0.00	0.0	1.2	OK
1.010	11	5.485	0.035	0.000	0.43	0.0	150.7	SURCHARGED
1.011	11a	5.419	0.000	0.000	0.95	0.0	147.1	OK
1.012	12	5.357	-0.003	0.000	1.00	0.0	159.8	OK
5.000	25	6.393	-0.162	0.000	0.42	0.0	27.5	OK
5.001	26	6.333	-0.079	0.000	0.50	0.0	32.4	OK
5.002	27	6.291	0.029	0.000	0.93	0.0	58.1	FLOOD RISK
5.003	28	6.208	0.036	0.000	1.05	0.0	70.6	SURCHARGED
6.000	29	6.666	0.213	0.000	0.64	0.0	36.6	SURCHARGED
6.001	30	6.578	0.174	0.000	0.72	0.0	41.5	FLOOD RISK
6.002	31	6.492	0.138	0.000	0.67	0.0	44.8	SURCHARGED
6.003	32	6.401	0.246	0.000	1.23	0.0	70.8	SURCHARGED
6.004	33	6.316	0.212	0.000	1.12	0.0	72.3	SURCHARGED
6.005	34	6.149	0.177	0.000	1.89	0.0	113.9	SURCHARGED
5.004	35	5.914	0.000	0.000	0.86	0.0	179.6	OK
5.005	36	5.870	0.000	0.000	1.00	0.0	184.8	SURCHARGED
5.006	37	5.833	0.000	0.000	0.72	0.0	174.1	SURCHARGED
7.000	48	5.842	0.000	0.000	0.14	0.0	35.2	OK
5.007	38	5.774	0.013	0.000	1.56	0.0	213.3	SURCHARGED
8.000	53	5.812	0.000	0.000	0.14	0.0	19.2	OK
8.001	54	5.791	0.000	0.000	0.15	0.0	33.1	OK
5.008	39	5.742	0.000	0.000	1.28	0.0	222.1	OK
5.009	40	5.578	-0.131	0.000	0.91	0.0	234.0	OK
9.000	48	5.597	-0.357	0.000	0.23	0.0	57.9	OK
9.001	49	5.535	-0.331	0.000	0.29	0.0	71.5	OK
9.002	50	5.473	-0.320	0.000	0.35	0.0	81.0	OK
9.003	51	5.406	-0.330	0.000	0.36	0.0	85.8	OK
9.004	52	5.330	-0.341	0.000	0.03	0.0	6.3	OK
5.010	41	5.330	-0.574	0.000	0.02	0.0	8.5	OK*
5.011	42	5.334	-0.537	0.000	0.03	0.0	8.3	OK
5.012	43	5.220	-0.634	0.000	0.01	0.0	5.1	OK*
5.013	44	5.256	-0.578	0.000	0.01	0.0	4.9	OK
5.014	45	5.120	-0.668	0.000	0.01	0.0	6.1	OK*
5.015	46	5.161	-0.611	0.000	0.02	0.0	6.2	OK
10.000	55	5.210	-0.357	0.000	0.03	0.0	5.2	OK
10.001	56	5.209	-0.316	0.000	0.15	0.0	31.1	OK
10.002	57	5.195	-0.288	0.000	0.53	0.0	70.8	OK
5.016	47	5.073	-0.690	0.000	0.01	0.0	7.0	OK*
1.013	13	5.073	-0.564	0.000	0.02	0.0	9.8	OK*
1.014	14	5.069	-0.205	0.000	0.06	0.0	9.5	OK
1.015	15	4.743	-0.514	0.000	0.04	0.0	9.5	OK
1.016	16	4.665	-0.504	0.000	0.04	0.0	9.5	OK
1.017	17	4.612	-0.505	0.000	0.04	0.0	9.5	OK
1.018	18	4.565	-0.500	0.000	0.05	0.0	9.5	OK
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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for Storm - Net 1

PN	US/MH Name	Water	Surch'd Depth (m)	Flooded	Flow / Cap.	O'flow	Pipe	Status
		Level (m)		Volume (m³)		(1/s)	Flow (1/s)	
1.019	19	4.523	-0.504	0.000	0.04	0.0	9.5	OK
1.020	20	4.476	-0.498	0.000	0.05	0.0	9.5	OK
1.021	20a	4.436	-0.507	0.000	0.06	0.0	9.5	OK

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

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coefficient	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	5
Number of Online Controls	4	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	0.350
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	19.000	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0	DVD Status	ON
Analysis Timestep	Fine	Inertia Status	ON
DTS Status	OFF		

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)	1, 30, 100
Climate Change (%)	0, 0, 40

PN	Storm	Return Period	Climate Change	First X Surchage	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
1.000	15 Winter	100	+40%	100/15 Summer				
1.001	15 Winter	100	+40%	100/15 Summer				
1.002	15 Winter	100	+40%	100/15 Summer				
1.003	15 Winter	100	+40%	100/15 Summer				
1.004	15 Winter	100	+40%	30/15 Winter				
1.005	15 Winter	100	+40%	100/15 Summer				
1.006	15 Winter	100	+40%	100/15 Summer				
1.007	15 Winter	100	+40%	100/15 Summer				
2.000	15 Winter	100	+40%	100/15 Summer				
1.008	15 Winter	100	+40%	100/15 Summer				
3.000	15 Winter	100	+40%	100/15 Summer				
1.009	15 Winter	100	+40%	30/15 Winter				
4.000	15 Winter	100	+40%	100/15 Summer				
1.010	15 Winter	100	+40%	30/30 Winter				
1.011	15 Winter	100	+40%	100/15 Summer				
1.012	15 Winter	100	+40%	100/15 Summer				
5.000	15 Winter	100	+40%	100/15 Summer				
5.001	15 Winter	100	+40%	100/15 Summer				
5.002	15 Winter	100	+40%	30/15 Summer	100/15 Summer			5
5.003	30 Summer	100	+40%	30/15 Summer	100/15 Winter			2
6.000	15 Summer	100	+40%	30/15 Summer				

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<u>100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm - Net 1</u>								
PN	Storm	Return Period	Climate Change	First X Surcharge	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
6.001	15 Winter	100	+40%	30/15 Summer	100/15 Summer			6
6.002	15 Winter	100	+40%	30/15 Summer				
6.003	15 Summer	100	+40%	30/15 Summer				
6.004	15 Winter	100	+40%	30/15 Summer				
6.005	15 Winter	100	+40%	30/15 Summer				
5.004	15 Winter	100	+40%	100/15 Summer				
5.005	15 Winter	100	+40%	30/15 Winter				
5.006	15 Winter	100	+40%	30/30 Summer				
7.000	15 Winter	100	+40%	100/15 Summer				
5.007	15 Winter	100	+40%	30/15 Winter				
8.000	15 Winter	100	+40%	100/15 Summer				
8.001	15 Winter	100	+40%	100/15 Summer				
5.008	15 Winter	100	+40%	100/15 Summer				
5.009	15 Winter	100	+40%	100/15 Summer				
9.000	15 Winter	100	+40%					
9.001	15 Winter	100	+40%					
9.002	2160 Winter	100	+40%					
9.003	2160 Winter	100	+40%					
9.004	2160 Winter	100	+40%					
5.010	2160 Winter	100	+40%					
5.011	2160 Winter	100	+40%					
5.012	2160 Winter	100	+40%					
5.013	2160 Winter	100	+40%					
5.014	2160 Winter	100	+40%					
5.015	2160 Winter	100	+40%					
10.000	15 Winter	100	+40%					
10.001	15 Winter	100	+40%					
10.002	15 Winter	100	+40%					
5.016	2160 Winter	100	+40%					
1.013	2160 Winter	100	+40%					
1.014	2160 Winter	100	+40%	100/360 Winter				
1.015	1440 Summer	100	+40%					
1.016	1440 Summer	100	+40%					
1.017	1440 Summer	100	+40%					
1.018	1440 Summer	100	+40%					
1.019	1440 Summer	100	+40%					
1.020	2160 Summer	100	+40%					
1.021	2160 Summer	100	+40%					
		Water		Flooded		Pipe		
PN	US/MH Name	Level (m)	Surch'd Depth (m)	Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
1.000	1	6.444	0.547	0.000	0.70	0.0	63.1	FLOOD RISK
1.001	2	6.431	0.555	0.000	0.59	0.0	64.9	FLOOD RISK
1.002	3	6.410	0.574	0.000	0.59	0.0	65.2	FLOOD RISK
1.003	4	6.356	0.535	0.000	0.52	0.0	76.1	FLOOD RISK
1.004	5	6.312	0.619	0.000	0.93	0.0	123.8	SURCHARGED
1.005	6	6.253	0.621	0.000	1.38	0.0	125.8	SURCHARGED
1.006	7	6.224	0.613	0.000	1.43	0.0	144.1	SURCHARGED
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PN	US/MH Name	Water Level (m)	Surch'd Depth (m)	Flooded Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	Status
1.007	8	6.178	0.597	0.000	1.77	0.0	177.2	SURCHARGED
2.000	22	6.105	0.474	0.000	0.18	0.0	43.9	SURCHARGED
1.008	9	6.094	0.543	0.000	0.87	0.0	211.9	SURCHARGED
3.000	23	6.074	0.536	0.000	0.77	0.0	182.6	SURCHARGED
1.009	10	6.036	0.562	0.000	3.01	0.0	412.0	SURCHARGED
4.000	24	5.868	0.343	0.000	0.01	0.0	2.8	SURCHARGED
1.010	11	5.868	0.418	0.000	1.17	0.0	404.7	SURCHARGED
1.011	11a	5.702	0.283	0.000	2.53	0.0	393.1	SURCHARGED
1.012	12	5.518	0.158	0.000	2.84	0.0	453.5	SURCHARGED
5.000	25	6.796	0.241	0.000	0.72	0.0	47.1	SURCHARGED
5.001	26	6.707	0.295	0.000	0.96	0.0	62.7	FLOOD RISK
5.002	27	6.568	0.306	18.017	1.02	0.0	63.5	FLOOD
5.003	28	6.550	0.378	0.042	1.25	0.0	83.8	FLOOD
6.000	29	6.985	0.532	0.000	1.30	0.0	74.5	SURCHARGED
6.001	30	6.875	0.471	25.103	1.02	0.0	58.4	FLOOD
6.002	31	6.933	0.579	0.000	0.88	0.0	58.8	FLOOD RISK
6.003	32	6.965	0.810	0.000	1.56	0.0	89.9	SURCHARGED
6.004	33	6.895	0.791	0.000	1.38	0.0	88.9	SURCHARGED
6.005	34	6.804	0.832	0.000	2.93	0.0	176.3	SURCHARGED
5.004	35	6.456	0.542	0.000	1.33	0.0	279.4	SURCHARGED
5.005	36	6.413	0.543	0.000	1.53	0.0	284.6	SURCHARGED
5.006	37	6.364	0.531	0.000	1.24	0.0	300.8	SURCHARGED
7.000	48	6.276	0.434	0.000	0.28	0.0	68.2	SURCHARGED
5.007	38	6.259	0.498	0.000	2.61	0.0	357.8	SURCHARGED
8.000	53	6.148	0.336	0.000	0.31	0.0	41.5	SURCHARGED
8.001	54	6.142	0.351	0.000	0.32	0.0	71.7	SURCHARGED
5.008	39	6.127	0.385	0.000	2.44	0.0	422.9	SURCHARGED
5.009	40	5.945	0.236	0.000	1.66	0.0	424.7	SURCHARGED
9.000	48	5.707	-0.247	0.000	0.42	0.0	104.9	OK
9.001	49	5.651	-0.215	0.000	0.53	0.0	129.2	OK
9.002	50	5.591	-0.202	0.000	0.03	0.0	6.9	OK
9.003	51	5.591	-0.145	0.000	0.03	0.0	7.8	OK
9.004	52	5.591	-0.080	0.000	0.03	0.0	7.5	OK
5.010	41	5.591	-0.313	0.000	0.02	0.0	10.1	OK*
5.011	42	5.586	-0.285	0.000	0.03	0.0	9.5	OK
5.012	43	5.478	-0.376	0.000	0.01	0.0	5.6	OK*
5.013	44	5.472	-0.362	0.000	0.01	0.0	6.4	OK
5.014	45	5.374	-0.414	0.000	0.02	0.0	8.6	OK*
5.015	46	5.417	-0.355	0.000	0.02	0.0	8.1	OK
10.000	55	5.368	-0.199	0.000	0.05	0.0	9.4	OK
10.001	56	5.364	-0.161	0.000	0.28	0.0	57.7	OK
10.002	57	5.338	-0.145	0.000	0.97	0.0	130.4	OK
5.016	47	5.327	-0.436	0.000	0.01	0.0	8.6	OK*
1.013	13	5.327	-0.310	0.000	0.02	0.0	10.6	OK*
1.014	14	5.319	0.045	0.000	0.06	0.0	10.0	SURCHARGED
1.015	15	4.745	-0.512	0.000	0.04	0.0	10.0	OK
1.016	16	4.667	-0.502	0.000	0.04	0.0	10.0	OK
1.017	17	4.615	-0.502	0.000	0.04	0.0	10.0	OK
1.018	18	4.568	-0.497	0.000	0.05	0.0	10.0	OK
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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm - Net 1

PN	US/MH Name	Water	Surch'd Depth (m)	Flooded	Flow / Cap.	O'flow	Pipe	Status
		Level (m)		Volume (m³)		(1/s)	Flow (1/s)	
1.019	19	4.525	-0.502	0.000	0.04	0.0	10.0	OK
1.020	20	4.478	-0.496	0.000	0.05	0.0	10.0	OK
1.021	20a	4.438	-0.505	0.000	0.06	0.0	10.0	OK

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Micro Drainage							Network 2017.1.2																																																																																																																																								
<u>STORM SEWER DESIGN by the Modified Rational Method</u> <u>Design Criteria for Storm - Net 2</u> Pipe Sizes STANDARD Manhole Sizes STANDARD FSR Rainfall Model - England and Wales <table><tr><td>Return Period (years)</td><td>2</td><td>PIMP (%)</td><td>100</td></tr><tr><td>M5-60 (mm)</td><td>19.000</td><td>Add Flow / Climate Change (%)</td><td>10</td></tr><tr><td>Ratio R</td><td>0.350</td><td>Minimum Backdrop Height (m)</td><td>0.000</td></tr><tr><td>Maximum Rainfall (mm/hr)</td><td>50</td><td>Maximum Backdrop Height (m)</td><td>0.000</td></tr><tr><td>Maximum Time of Concentration (mins)</td><td>30</td><td>Min Design Depth for Optimisation (m)</td><td>1.200</td></tr><tr><td>Foul Sewage (l/s/ha)</td><td>0.000</td><td>Min Vel for Auto Design only (m/s)</td><td>1.00</td></tr><tr><td>Volumetric Runoff Coeff.</td><td>0.750</td><td>Min Slope for Optimisation (1:X)</td><td>500</td></tr></table> Designed with Level Soffits												Return Period (years)	2	PIMP (%)	100	M5-60 (mm)	19.000	Add Flow / Climate Change (%)	10	Ratio R	0.350	Minimum Backdrop Height (m)	0.000	Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	0.000	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																																																																																																								
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Date 22/01/2021 17:34	Designed by Tim K	
File SW2.MDX	Checked by Terry S	
Micro Drainage		Network 2017.1.2

Area Summary for Storm - Net 2

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	-	-	100	0.000	0.000	0.000
2.000	-	-	100	0.048	0.048	0.048
3.000	-	-	100	0.124	0.124	0.124
3.001	-	-	100	0.018	0.018	0.018
3.002	-	-	100	0.014	0.014	0.014
3.003	-	-	100	0.050	0.050	0.050
3.004	-	-	100	0.023	0.023	0.023
3.005	-	-	100	0.026	0.026	0.026
3.006	-	-	100	0.000	0.000	0.000
2.001	-	-	100	0.243	0.243	0.243
4.000	-	-	100	0.000	0.000	0.000
1.001	-	-	100	0.023	0.023	0.023
1.002	-	-	100	0.000	0.000	0.000
1.003	-	-	100	0.000	0.000	0.000
1.004	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				0.569	0.569	0.569

Free Flowing Outfall Details for Storm - Net 2

Outfall Pipe Number	Outfall C. Name	Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
S1.004	S80	5.500	4.011	0.000	0	0

Simulation Criteria for Storm - Net 2

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 Coefficient	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	3
Number of Online Controls	1	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)	2	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	19.000	Storm Duration (mins)	30
Ratio R	0.350		

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Online Controls for Storm - Net 2

Hydro-Brake® Optimum Manhole: S79, DS/PN: S1.004, Volume (m³): 6.3

Unit Reference	MD-SHE-0079-3000-1200-3000
Design Head (m)	1.200
Design Flow (l/s)	3.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	79
Invert Level (m)	4.019
Minimum Outlet Pipe Diameter (mm)	100
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.200	3.0
Flush-Flo™	0.348	2.9
Kick-Flo®	0.707	2.4
Mean Flow over Head Range	-	2.6

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	2.3	1.200	3.0	3.000	4.6	7.000	6.8
0.200	2.8	1.400	3.2	3.500	4.9	7.500	7.0
0.300	2.9	1.600	3.4	4.000	5.2	8.000	7.3
0.400	2.9	1.800	3.6	4.500	5.5	8.500	7.5
0.500	2.8	2.000	3.8	5.000	5.8	9.000	7.7
0.600	2.7	2.200	4.0	5.500	6.1	9.500	7.9
0.800	2.5	2.400	4.1	6.000	6.3		
1.000	2.8	2.600	4.3	6.500	6.6		

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Storage Structures for Storm - Net 2

Tank or Pond Manhole: S75, DS/PN: S1.000

Invert Level (m) 4.600

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	95.2	1.180	325.6

Tank or Pond Manhole: S80, DS/PN: S4.000

Invert Level (m) 4.121

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	140.0	0.400	140.0	0.410	0.0

Tank or Pond Manhole: S78, DS/PN: S1.003

Invert Level (m) 4.167

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	67.6	1.333	263.5

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1 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for Storm - Net 2

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 Coefficient	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	3
Number of Online Controls	1	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	0.350
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	19.000	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0	DVD Status	ON
Analysis Timestep	Fine	Inertia Status	ON
DTS Status	OFF		

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)	1, 30, 100
Climate Change (%)	0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.
S1.000	S75	2160 Winter	1	+0%	30/180 Winter			
S2.000	S73	2160 Winter	1	+0%	30/1440 Winter			
S3.000	S66	15 Winter	1	+0%	100/120 Winter			
S3.001	S67	15 Winter	1	+0%	100/15 Winter			
S3.002	S68	15 Winter	1	+0%	100/15 Winter			
S3.003	S69	2160 Winter	1	+0%	100/120 Summer			
S3.004	S70	2160 Winter	1	+0%	100/60 Winter			
S3.005	S71	2160 Winter	1	+0%	30/1440 Winter			
S3.006	S72	2160 Winter	1	+0%	30/1440 Winter			
S2.001	S74	2160 Winter	1	+0%	30/480 Winter			
S4.000	S80	2160 Winter	1	+0%	30/180 Winter			
S1.001	S76	2160 Winter	1	+0%	30/360 Winter			
S1.002	S77	2160 Winter	1	+0%	30/180 Winter			
S1.003	S78	2160 Winter	1	+0%	30/120 Winter			
S1.004	S79	1440 Summer	1	+0%	1/1440 Summer	100/960 Winter		

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1 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for Storm - Net 2

PN	US/MH Name	Water	Surcharged	Flooded			Pipe	Status	Level Exceeded
		Level (m)	Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)	Flow (l/s)		
S1.000	S75	4.524	-0.147	0.000	0.00		0.0	OK	
S2.000	S73	4.525	-0.242	0.000	0.00		0.3	OK	
S3.000	S66	4.596	-0.452	0.000	0.12		16.8	OK	
S3.001	S67	4.563	-0.462	0.000	0.08		18.0	OK	
S3.002	S68	4.521	-0.448	0.000	0.13		18.3	OK	
S3.003	S69	4.521	-0.425	0.000	0.01		1.4	OK	
S3.004	S70	4.522	-0.327	0.000	0.01		1.5	OK	
S3.005	S71	4.524	-0.295	0.000	0.01		1.7	OK	
S3.006	S72	4.527	-0.253	0.000	0.01		1.6	OK	
S2.001	S74	4.525	-0.203	0.000	0.02		3.4	OK	
S4.000	S80	4.519	-0.152	0.000	0.00		0.4	OK	
S1.001	S76	4.524	-0.172	0.000	0.01		2.7	OK	
S1.002	S77	4.526	-0.148	0.000	0.01		2.7	OK	
S1.003	S78	4.522	-0.107	0.000	0.01		2.6	OK	
S1.004	S79	4.937	0.318	0.000	0.01		2.5	SURCHARGED	

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for Storm - Net 2

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 Coefficient	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	3
Number of Online Controls	1	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	0.350
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	19.000	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0	DVD Status	ON
Analysis Timestep	Fine	Inertia Status	ON
DTS Status	OFF		

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)	1, 30, 100
Climate Change (%)	0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
S1.000	S75	1440 Winter	30	+0%	30/180 Winter			
S2.000	S73	1440 Winter	30	+0%	30/1440 Winter			
S3.000	S66	1440 Winter	30	+0%	100/120 Winter			
S3.001	S67	1440 Winter	30	+0%	100/15 Winter			
S3.002	S68	1440 Winter	30	+0%	100/15 Winter			
S3.003	S69	1440 Winter	30	+0%	100/120 Summer			
S3.004	S70	1440 Winter	30	+0%	100/60 Winter			
S3.005	S71	1440 Winter	30	+0%	30/1440 Winter			
S3.006	S72	1440 Winter	30	+0%	30/1440 Winter			
S2.001	S74	1440 Winter	30	+0%	30/480 Winter			
S4.000	S80	1440 Winter	30	+0%	30/180 Winter			
S1.001	S76	1440 Winter	30	+0%	30/360 Winter			
S1.002	S77	1440 Winter	30	+0%	30/180 Winter			
S1.003	S78	1440 Winter	30	+0%	30/120 Winter			
S1.004	S79	1440 Winter	30	+0%	1/1440 Summer	100/960 Winter		

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for Storm - Net 2

		Water	Surcharged	Flooded			Pipe		
	US/MH	Level	Depth	Volume	Flow /	Overflow	Flow		Level
PN	Name	(m)	(m)	(m³)	Cap.	(l/s)	(l/s)	Status	Exceeded
S1.000	S75	4.820	0.149	0.000	0.01		1.1	SURCHARGED	
S2.000	S73	4.826	0.059	0.000	0.00		0.8	SURCHARGED	
S3.000	S66	4.824	-0.224	0.000	0.02		2.2	OK	
S3.001	S67	4.824	-0.201	0.000	0.01		2.5	OK	
S3.002	S68	4.824	-0.145	0.000	0.02		2.5	OK	
S3.003	S69	4.825	-0.121	0.000	0.01		3.2	OK	
S3.004	S70	4.825	-0.024	0.000	0.02		3.1	OK	
S3.005	S71	4.825	0.006	0.000	0.02		3.3	SURCHARGED	
S3.006	S72	4.825	0.045	0.000	0.01		3.1	SURCHARGED	
S2.001	S74	4.825	0.097	0.000	0.05		7.7	SURCHARGED	
S4.000	S80	4.825	0.154	0.000	0.00		0.0	SURCHARGED	
S1.001	S76	4.826	0.130	0.000	0.02		6.5	SURCHARGED	
S1.002	S77	4.829	0.155	0.000	0.03		6.2	SURCHARGED	
S1.003	S78	4.828	0.199	0.000	0.02		4.4	SURCHARGED	
S1.004	S79	5.219	0.600	0.000	0.01		2.9	FLOOD RISK	

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm - Net 2

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 Coefficient	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	3
Number of Online Controls	1	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	0.350
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	19.000	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0	DVD Status	ON
Analysis Timestep	Fine	Inertia Status	ON
DTS Status	OFF		

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)	1, 30, 100
Climate Change (%)	0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
S1.000	S75	1440 Winter	100	+40%	30/180 Winter			
S2.000	S73	1440 Winter	100	+40%	30/1440 Winter			
S3.000	S66	1440 Winter	100	+40%	100/120 Winter			
S3.001	S67	1440 Winter	100	+40%	100/15 Winter			
S3.002	S68	1440 Winter	100	+40%	100/15 Winter			
S3.003	S69	1440 Winter	100	+40%	100/120 Summer			
S3.004	S70	1440 Winter	100	+40%	100/60 Winter			
S3.005	S71	1440 Winter	100	+40%	30/1440 Winter			
S3.006	S72	1440 Winter	100	+40%	30/1440 Winter			
S2.001	S74	1440 Winter	100	+40%	30/480 Winter			
S4.000	S80	1440 Winter	100	+40%	30/180 Winter			
S1.001	S76	1440 Winter	100	+40%	30/360 Winter			
S1.002	S77	1440 Winter	100	+40%	30/180 Winter			
S1.003	S78	1440 Winter	100	+40%	30/120 Winter			
S1.004	S79	480 Winter	100	+40%	1/1440 Summer	100/960 Winter		

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm - Net 2

PN	US/MH Name	Water	Surcharged	Flooded	Flow / Cap.	Overflow (l/s)	Pipe	Status	Level
		Level (m)	Depth (m)	Volume (m³)			Flow (l/s)		Level Exceeded
S1.000	S75	5.421	0.750	0.000	0.01		1.4	SURCHARGED	
S2.000	S73	5.418	0.651	0.000	0.01		1.5	SURCHARGED	
S3.000	S66	5.418	0.370	0.000	0.03		3.9	SURCHARGED	
S3.001	S67	5.418	0.393	0.000	0.02		4.2	SURCHARGED	
S3.002	S68	5.418	0.449	0.000	0.03		4.3	SURCHARGED	
S3.003	S69	5.418	0.472	0.000	0.02		5.7	SURCHARGED	
S3.004	S70	5.418	0.569	0.000	0.04		6.4	SURCHARGED	
S3.005	S71	5.418	0.599	0.000	0.04		7.1	SURCHARGED	
S3.006	S72	5.418	0.638	0.000	0.03		7.0	SURCHARGED	
S2.001	S74	5.418	0.690	0.000	0.09		15.9	SURCHARGED	
S4.000	S80	5.417	0.746	0.000	0.00		0.0	SURCHARGED	
S1.001	S76	5.417	0.721	0.000	0.04		10.2	SURCHARGED	
S1.002	S77	5.419	0.745	0.000	0.05		9.9	SURCHARGED	
S1.003	S78	5.424	0.795	0.000	0.02		3.7	FLOOD RISK	
S1.004	S79	5.414	0.795	0.000	0.01		2.9	FLOOD RISK	

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STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm - Net 3

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	2	Add Flow / Climate Change (%)	10
M5-60 (mm)	19.000	Minimum Backdrop Height (m)	0.000
Ratio R	0.350	Maximum Backdrop Height (m)	0.000
Maximum Rainfall (mm/hr)	50	Min Design Depth for Optimisation (m)	1.200
Maximum Time of Concentration (mins)	30	Min Vel for Auto Design only (m/s)	1.00
Foul Sewage (l/s/ha)	0.000	Min Slope for Optimisation (1:X)	500
Volumetric Runoff Coeff.	0.750		

Designed with Level Soffits

Network Design Table for Storm - Net 3

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Auto Design
S1.000	14.282	0.024	585.0	0.036	5.00	0.0	0.600	o	600	
S1.001	23.685	0.040	585.0	0.089	0.00	0.0	0.600	o	600	
S1.002	63.535	0.109	585.0	0.111	0.00	0.0	0.600	o	600	
S1.003	20.138	0.034	585.0	0.047	0.00	0.0	0.600	o	600	
S1.004	26.439	0.045	585.0	0.053	0.00	0.0	0.600	o	600	
S1.005	9.354	0.016	584.6	0.000	0.00	0.0	0.600	o	600	
S1.006	4.409	0.008	585.0	0.000	0.00	0.0	0.600	o	600	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL E (m)	I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.000	50.00	5.24	4.288	0.036	0.0	0.0	0.5	1.00	282.6	5.4
S1.001	50.00	5.63	4.263	0.125	0.0	0.0	1.7	1.00	282.6	18.6
S1.002	50.00	6.69	4.223	0.236	0.0	0.0	3.2	1.00	282.6	35.2
S1.003	50.00	7.03	4.114	0.283	0.0	0.0	3.8	1.00	282.6	42.2
S1.004	50.00	7.47	4.080	0.336	0.0	0.0	4.5	1.00	282.6	50.0
S1.005	50.00	7.62	4.035	0.336	0.0	0.0	4.5	1.00	282.7	50.0
S1.006	50.00	7.70	4.019	0.336	0.0	0.0	4.5	1.00	282.6	50.0

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Manhole Schedules for Storm - Net 3

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
S58	6.320	2.032	Open Manhole	1500	S1.000	4.288	600				
S59	6.360	2.097	Open Manhole	1500	S1.001	4.263	600	S1.000	4.264	600	1
S60	6.130	1.907	Open Manhole	1500	S1.002	4.223	600	S1.001	4.223	600	
S61	5.910	1.796	Open Manhole	1500	S1.003	4.114	600	S1.002	4.114	600	
S62	5.970	1.890	Open Manhole	1500	S1.004	4.080	600	S1.003	4.080	600	
S63	5.620	1.585	Open Manhole	1500	S1.005	4.035	600	S1.004	4.035	600	
S64	5.500	1.481	Open Manhole	2100	S1.006	4.019	600	S1.005	4.019	600	
S65	5.500	1.489	Open Manhole	0		OUTFALL		S1.006	4.011	600	

Free Flowing Outfall Details for Storm - Net 3

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D, L (mm)	W (mm)
S1.006	S65	5.500	4.011	0.000	0	0

Simulation Criteria for Storm - Net 3

Volumetric Runoff Coeff	0.840	Additional Flow - % of Total Flow	10.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coefficient	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)	480
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	4
Number of Input Hydrographs	0	Number of Storage Structures	1
Number of Online Controls	1	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	Winter
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	19.000	Storm Duration (mins)	240
Ratio R	0.350		

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Date 22.01.2021	Designed by Tim K	
File SW3-STRAT SEPARATE.MDX	Checked by Terry S	
Innovyze	Network 2014.1.1	

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for Storm - Net 3

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 Coefficient	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	1
Number of Online Controls	1	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	0.350
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	19.000	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0	DVD Status	ON
Analysis Timestep	Fine	Inertia Status	ON
DTS Status	OFF		

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)	1, 30, 100
Climate Change (%)	0, 0, 40

PN	Storm	Return Period	Climate Change	First X Surchage	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
S1.000	15 Winter	1	0%	100/360 Winter				
S1.001	15 Winter	1	0%	100/360 Winter				
S1.002	15 Winter	1	0%	100/180 Winter				
S1.003	360 Winter	1	0%	100/120 Summer				
S1.004	360 Winter	1	0%	100/60 Winter				
S1.005	360 Winter	1	0%	100/60 Winter				
S1.006	480 Summer	1	0%	100/60 Summer				

PN	US/MH Name	Water		Flooded		Pipe		Status
		Level (m)	Surch'd Depth (m)	Volume (m³)	Flow / Cap. (l/s)	O'flow (l/s)	Pipe Flow (l/s)	
S1.000	S58	4.406	-0.482	0.000	0.03	0.0	4.8	OK
S1.001	S59	4.399	-0.464	0.000	0.07	0.0	14.5	OK
S1.002	S60	4.369	-0.454	0.000	0.10	0.0	24.8	OK
S1.003	S61	4.322	-0.392	0.000	0.03	0.0	6.1	OK
S1.004	S62	4.323	-0.357	0.000	0.03	0.0	7.1	OK
S1.005	S63	4.323	-0.312	0.000	0.01	0.0	2.2	OK
S1.006	S64	4.354	-0.265	0.000	0.01	0.0	2.8	OK

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for Storm - Net 3

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 Coefficient	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	1
Number of Online Controls	1	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	0.350
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	19.000	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0	DVD Status	ON
Analysis Timestep	Fine	Inertia Status	ON
DTS Status	OFF		

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)	1, 30, 100
Climate Change (%)	0, 0, 40

PN	Storm	Return Period	Climate Change	First X Surchage	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
S1.000	480 Winter	30	0%	100/360 Winter				
S1.001	480 Winter	30	0%	100/360 Winter				
S1.002	480 Winter	30	0%	100/180 Winter				
S1.003	480 Winter	30	0%	100/120 Summer				
S1.004	480 Winter	30	0%	100/60 Winter				
S1.005	480 Winter	30	0%	100/60 Winter				
S1.006	1440 Winter	30	0%	100/60 Summer				

PN	US/MH Name	Water		Flooded		Pipe		Status
		Level (m)	Surch'd Depth (m)	Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	
S1.000	S58	4.569	-0.319	0.000	0.01	0.0	1.5	OK
S1.001	S59	4.569	-0.294	0.000	0.02	0.0	5.0	OK
S1.002	S60	4.569	-0.254	0.000	0.04	0.0	9.2	OK
S1.003	S61	4.569	-0.145	0.000	0.05	0.0	9.6	OK
S1.004	S62	4.570	-0.110	0.000	0.05	0.0	11.4	OK
S1.005	S63	4.570	-0.065	0.000	0.01	0.0	2.2	OK
S1.006	S64	4.618	-0.001	0.000	0.01	0.0	2.9	OK

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm - Net 3

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 Coefficient	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	1
Number of Online Controls	1	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	0.350
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	19.000	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0	DVD Status	ON
Analysis Timestep	Fine	Inertia Status	ON
DTS Status	OFF		

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)	1, 30, 100
Climate Change (%)	0, 0, 40

PN	Storm	Return Period	Climate Change	First X Surchage	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
S1.000	360 Winter	100	+40%	100/360 Winter				
S1.001	360 Winter	100	+40%	100/360 Winter				
S1.002	360 Winter	100	+40%	100/180 Winter				
S1.003	360 Winter	100	+40%	100/120 Summer				
S1.004	360 Winter	100	+40%	100/60 Winter				
S1.005	360 Winter	100	+40%	100/60 Winter				
S1.006	1440 Winter	100	+40%	100/60 Summer				

PN	US/MH Name	Water		Flooded		Pipe		Status
		Level (m)	Surch'd Depth (m)	Volume (m³)	Flow / Cap.	O'flow (l/s)	Pipe Flow (l/s)	
S1.000	S58	4.902	0.014	0.000	0.02	0.0	3.1	SURCHARGED
S1.001	S59	4.902	0.039	0.000	0.05	0.0	10.5	SURCHARGED
S1.002	S60	4.902	0.079	0.000	0.08	0.0	19.8	SURCHARGED
S1.003	S61	4.902	0.188	0.000	0.13	0.0	23.7	SURCHARGED
S1.004	S62	4.902	0.222	0.000	0.13	0.0	28.1	SURCHARGED
S1.005	S63	4.901	0.266	0.000	0.03	0.0	4.6	SURCHARGED
S1.006	S64	5.052	0.433	0.000	0.01	0.0	2.9	SURCHARGED

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Appendix (G)
SuDS Maintenance Strategy

Land North of Sefter Road
Bognor Regis, West Sussex

OWNERS MANUAL

Relating to Surface Water Drainage Maintenance

The site has been designed in accordance with Sustainable Drainage Systems (SuDS) techniques.

An extract from the SuDS Manual (CIRIA C753) states “Sedimentation is one of the primary removal mechanisms in SUDS. Most pollution in runoff is attached to sediment particles and therefore removal of sediment results in a significant reduction in pollutant loads..”.

In order to remove sedimentation the surface water drainage design utilises deep seal trapped gullies throughout, catchpit manholes upstream of the surface water granular filter drains and bio-retention areas in attenuation ponds.

CONTENTS

- 1) Explanation of the Surface Water Drainage System
- 2) Operating and Maintenance Responsibility
- 3) Maintenance Schedule for catchpits, control chambers, flow control devices and gullies
- 4) Maintenance Schedule for attenuation basins, bioretention areas and swales
- 5) Maintenance Schedule for filter trenches and porous pipework
- 6) Maintenance Schedule for solid wall pipes
- 7) Reasons for Maintenance

1) Explanation of the Surface Water Drainage System

The Principle of SUDs has been adopted for the whole of the site, calculations have been carried out using MicroDrainage with a storm return period of 100 years and an allowance of 40% for climate change and 10% allowance for urban creep.

Generally roof water drains direct to the domestic drainage system within each curtilage and from there will be directed to the below ground surface water network

Hardstanding areas and access roads or drives, drain to trapped gullies which outfall to the surface water drainage system within the site.

2) Operating and Maintenance Responsibility

Taylor Wimpey (TW) are responsible for maintaining the surface water drainage systems on this site during the construction period. A management company nominated by TW which during the construction period will have TW as the sole directors. Upon handover and occupation, a Maintenance Company will be handed over to residents who will take over as Directors.

The Management Company will appoint a managing agent who will ensure that the SuDS are maintained as set out in this document. The maintenance and operation will be funded through contributions from the residents to the maintenance company.

3) Maintenance Schedule for catchpits, control chambers, flow control devices and gullies

Flow Control Maintenance

Normally, little maintenance is required as there are no moving parts within the Flow Control. The Flow Control is fitted with pivoting by-pass door, which allows the manhole to be drained down should blockage occur. It is recommended that the unit be inspected at six monthly intervals with hose down if required. All flow controls are typically manufactured from grade 304 Stainless Steel which has an estimated life span in excess of the design life of drainage systems.

Maintenance Schedule	Required Action	Recommended Frequency
Regular maintenance	Inspect and identify any areas that are not operating correctly. If required, take remedial action.	Monthly for 3 months, then six monthly
	Debris removal from catchment surface (where may cause risks to performance)	Monthly
	Remove sediment and oil deposits from all trapped gullies.	Annually, or as required.
	Remove sediment from structures upstream of the cellular storage tanks.	Annually, or as required.
Remedial actions	Repair/rehabilitation of inlets, outlets, 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 and after large storms

4) Maintenance Schedule for Attenuation basins , bio-retention areas and swales

Maintenance Schedule	Required Action	Recommended Frequency
Regular maintenance	Litter and debris removal.	Monthly
	Grass cutting – for spillways and access routes.	Monthly (during growing season), or as required.
	Grass cutting – meadow grass in and around basin.	Annually
	Manage other vegetation and remove nuisance plants.	Monthly (at start, then as required).
	Tidy all dead growth before start of growing season.	Annually.
	Remove sediment from inlets, outlet and forebay.	Annually (or as required).
Occasional maintenance	Check for poor vegetation growth due to lack of sunlight or leaf dropping litter and cut back adjacent vegetation where possible/	Annually
	Re-seed areas of poor vegetation growth. Alter plant types to better suit conditions, if required	Annually, or if bare soil is exposed over 10% or more of the basin/swale treatment area
	Prune and trim trees and remove cuttings.	2 years (or as required). Ensure this is undertaken outside of bird nesting season.
Remedial actions	Repair of erosion or other damage by re-turfing or reseeding.	As required
	Re-level uneven surfaces and reinstate design levels.	As required.
	Repair/rehabilitation of inlets, outlets and overflows.	As required.

	Remove and dispose of oils or petrol residues using safe standard practices	As required
Monitoring	Inspect inlets, outlets and overflows for blockages, and clear if required.	Monthly/ after large storms.
	Inspect banksides, structures, pipework etc. for evidence of physical damage.	Monthly/ after large storms.
	Inspect inlets and facility surface for silt accumulation. Establish appropriate silt removal frequencies.	Half yearly.
	Check flow control device and other mechanical devices.	Half yearly.

5) Maintenance Schedule for Filter trenches and porous pipework

Maintenance Schedule	Required Action	Recommended Frequency
Regular maintenance	Litter and debris removal from trench surface, access chambers and pre-treatment devices.	Monthly (or as required).
	Removal and washing of exposed stones on the trench surface.	Annual (bi-annual the first year) or when silt is evident on the surface.
	Trimming of any roots that may be causing blockages.	Annual (semi-annual the first year).
	Remove weeds on the trench surface.	Monthly (at start, then as required).
Occasional maintenance	Removal of sediment from pre-treatment devices.	Six monthly
	Remove tree roots or trees that grow close to the trench.	As required.
	At locations with high pollution loads, remove surface geotextile and replace, and wash or replace filter media.	Five yearly.
Remedial actions	Clear perforated pipework of blockages.	As required.
	Rehabilitate infiltration or filtration surfaces.	As required.
	Replace geotextiles and clean and replace filter media, if clogging occurs.	As required.
	Inspect inlets, outlets and inspection points for blockages, clogging, standing water and structural damage.	As required.
Monitoring	Inspect pre-treatment systems, inlets, trench surfaces and perforated pipework for silt accumulation. Establish appropriate silt removal frequencies.	Half yearly.

6) Maintenance Schedule for Grilles

Maintenance Schedule	Required Action	Recommended Frequency
Regular maintenance	Litter and debris removal.	Monthly (or as required).
Occasional maintenance	Check moving parts and locks. Oil and ensure free moving. Replace when necessary.	As required.
Remedial actions	Remove build-up of sediment.	As required.
Monitoring	Inspect for blockages, and clear if required.	Monthly
	Inspect inlets and facility surface for silt accumulation. Establish appropriate silt removal frequencies.	Half yearly.

7) Maintenance Schedule for solid wall pipes

Maintenance Schedule	Required Action	Recommended Frequency
Regular maintenance	Inspect and identify any areas that are not operating correctly. If required, take remedial action.	Monthly for 3 months, then six monthly.
	Debris removal from catchment surface (where may cause risks to performance)	Monthly
	Inspect chambers and manholes for evidence of pipes operating correctly and take remedial action if necessary, to include jetting of pipework.	Monthly for 3 months, then annually

8) Reasons for Maintenance

Surface water contains variable amounts of sediment which settles out at certain locations and could cause blockages if left. Road gullies also trap oil and prevent it entering the surface water sewer system.