

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	2	Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	0	Minimum Velocity (m/s)	1.00
FSR Region	England and Wales	Connection Type	Level Soffits
M5-60 (mm)	20.000	Minimum Backdrop Height (m)	0.200
Ratio-R	0.400	Preferred Cover Depth (m)	1.200
CV	0.750	Include Intermediate Ground	✓
Time of Entry (mins)	5.00	Enforce best practice design rules	x

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
EX COMINED MH 6908			19.990	1200	564689.120	173975.380	2.400
SW MH 01.00			19.820	475	564686.440	173984.380	1.200
TANK	0.017	5.00	16.325	50	564685.500	173994.350	2.525
SW MH 06.00	0.014	5.00	16.325	475	564661.830	173973.930	1.050
SW MH 05.00	0.014	5.00	16.325	475	564681.100	173979.410	1.251
FW CW 01.00			19.820	1350	564687.900	173979.200	1.650
SW MH 02.00			16.325	1200	564684.450	173990.250	2.575
SW MH 04.00	0.014	5.00	16.325	1200	564676.120	173994.760	1.413
SW MH 03.00			17.100	1200	564682.200	173997.160	2.253
SW MH 07.00	0.014	5.00	16.325	475	564665.070	173991.300	1.050

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.005	SW MH 02.00	SW MH 01.00	6.198	0.600	13.750	18.620	-4.870	-1.3	150	5.94	50.0
1.004	TANK	SW MH 02.00	4.232	0.600	13.800	13.750	0.050	84.6	150	5.84	50.0
1.007	FW CW 01.00	EX COMINED MH 6908	4.010	0.600	18.170	17.590	0.580	6.9	150	5.99	50.0
1.000	SW MH 06.00	SW MH 05.00	20.034	0.600	15.275	15.074	0.201	99.7	150	5.33	50.0
1.006	SW MH 01.00	FW CW 01.00	5.382	0.600	18.620	18.170	0.450	12.0	150	5.98	50.0
1.001	SW MH 05.00	SW MH 04.00	16.138	0.600	15.074	14.912	0.162	99.6	150	5.60	50.0
1.002	SW MH 04.00	SW MH 03.00	6.537	0.600	14.912	14.847	0.065	100.6	150	5.71	50.0
1.003	SW MH 03.00	TANK	4.334	0.600	14.847	14.800	0.047	92.2	150	5.78	50.0
2.000	SW MH 07.00	SW MH 04.00	11.579	0.600	15.275	14.912	0.363	31.9	150	5.11	50.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)
1.005	1.000	17.7	9.9	2.425	1.050	0.073	0.0
1.004	1.093	19.3	9.9	2.375	2.425	0.073	0.0
1.007	3.856	68.1	9.9	1.500	2.250	0.073	0.0
1.000	1.006	17.8	1.9	0.900	1.101	0.014	0.0
1.006	2.929	51.8	9.9	1.050	1.500	0.073	0.0
1.001	1.007	17.8	3.8	1.101	1.263	0.028	0.0
1.002	1.002	17.7	7.6	1.263	2.103	0.056	0.0
1.003	1.047	18.5	7.6	2.103	1.375	0.056	0.0
2.000	1.788	31.6	1.9	0.900	1.263	0.014	0.0

Pipeline Schedule

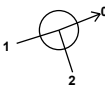
Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.005	6.198	-1.3	150	Circular	16.325	13.750	2.425	19.820	18.620	1.050
1.004	4.232	84.6	150	Circular	16.325	13.800	2.375	16.325	13.750	2.425
1.007	4.010	6.9	150	Circular	19.820	18.170	1.500	19.990	17.590	2.250
1.000	20.034	99.7	150	Circular	16.325	15.275	0.900	16.325	15.074	1.101
1.006	5.382	12.0	150	Circular	19.820	18.620	1.050	19.820	18.170	1.500
1.001	16.138	99.6	150	Circular	16.325	15.074	1.101	16.325	14.912	1.263
1.002	6.537	100.6	150	Circular	16.325	14.912	1.263	17.100	14.847	2.103
1.003	4.334	92.2	150	Circular	17.100	14.847	2.103	16.325	14.800	1.375
2.000	11.579	31.9	150	Circular	16.325	15.275	0.900	16.325	14.912	1.263

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.005	SW MH 02.00	1200	Manhole	Adoptable	SW MH 01.00	475	Manhole	Adoptable
1.004	TANK	50	Manhole	Adoptable	SW MH 02.00	1200	Manhole	Adoptable
1.007	FW CW 01.00	1350	Manhole	Adoptable	EX COMINED MH 6908	1200	Manhole	Adoptable
1.000	SW MH 06.00	475	Manhole	Adoptable	SW MH 05.00	475	Manhole	Adoptable
1.006	SW MH 01.00	475	Manhole	Adoptable	FW CW 01.00	1350	Manhole	Adoptable
1.001	SW MH 05.00	475	Manhole	Adoptable	SW MH 04.00	1200	Manhole	Adoptable
1.002	SW MH 04.00	1200	Manhole	Adoptable	SW MH 03.00	1200	Manhole	Adoptable
1.003	SW MH 03.00	1200	Manhole	Adoptable	TANK	50	Manhole	Adoptable
2.000	SW MH 07.00	475	Manhole	Adoptable	SW MH 04.00	1200	Manhole	Adoptable

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
EX COMINED MH 6908	564689.120	173975.380	19.990	2.400	1200	 1	1.007	17.590	150
SW MH 01.00	564686.440	173984.380	19.820	1.200	475	 1	1.005	18.620	150
TANK	564685.500	173994.350	16.325	2.525	50	 0	1.006	18.620	150
						 1	1.003	14.800	150
						 0	1.004	13.800	150
SW MH 06.00	564661.830	173973.930	16.325	1.050	475	 0	1.000	15.275	150
SW MH 05.00	564681.100	173979.410	16.325	1.251	475	 1	1.000	15.074	150
						 0	1.001	15.074	150
FW CW 01.00	564687.900	173979.200	19.820	1.650	1350	 1	1.006	18.170	150
						 0	1.007	18.170	150

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
SW MH 02.00	564684.450	173990.250	16.325	2.575	1200		1 1.004	13.750	150
SW MH 04.00	564676.120	173994.760	16.325	1.413	1200		1 2.000 2 1.001	14.912	150
SW MH 03.00	564682.200	173997.160	17.100	2.253	1200		1 1.002	14.912	150
SW MH 07.00	564665.070	173991.300	16.325	1.050	475		1 1.002	14.847	150
							0 2.000	15.275	150

Simulation Settings

Rainfall Methodology	FSR	Analysis Speed	Normal
FSR Region	England and Wales	Skip Steady State	x
M5-60 (mm)	20.000	Drain Down Time (mins)	240
Ratio-R	0.400	Additional Storage (m³/ha)	20.0
Summer CV	0.750	Check Discharge Rate(s)	x
Winter CV	0.840	Check Discharge Volume	x

Storm Durations

15	60	180	360	600	960	2160	4320	7200	10080
30	120	240	480	720	1440	2880	5760	8640	

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	0	0	0
30	0	0	0
100	40	0	0

Node SW MH 02.00 Online Pump Control

Flap Valve	x	Design Depth (m)	1.650	Switch off depth (m)	0.050
Replaces Downstream Link	✓	Design Flow (l/s)	2.0		
Invert Level (m)	13.400	Switch on depth (m)	0.500		

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.001	2.000	1.600	2.000

Node TANK Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	13.800
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	124

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	27.0	0.0	1.200	27.0	0.0	1.201	0.0	0.0

Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
1 year 15 minute summer	109.521	30.991
1 year 15 minute winter	76.857	30.991
1 year 30 minute summer	71.439	20.215
1 year 30 minute winter	50.133	20.215
1 year 60 minute summer	48.435	12.800
1 year 60 minute winter	32.179	12.800
1 year 120 minute summer	30.053	7.942
1 year 120 minute winter	19.966	7.942
1 year 180 minute summer	23.233	5.979
1 year 180 minute winter	15.102	5.979
1 year 240 minute summer	18.475	4.882
1 year 240 minute winter	12.274	4.882
1 year 360 minute summer	14.169	3.646
1 year 360 minute winter	9.210	3.646
1 year 480 minute summer	11.185	2.956
1 year 480 minute winter	7.431	2.956
1 year 600 minute summer	9.182	2.511
1 year 600 minute winter	6.274	2.511
1 year 720 minute summer	8.203	2.199
1 year 720 minute winter	5.513	2.199
1 year 960 minute summer	6.768	1.782
1 year 960 minute winter	4.483	1.782
1 year 1440 minute summer	4.949	1.326
1 year 1440 minute winter	3.326	1.326
1 year 2160 minute summer	3.574	0.988
1 year 2160 minute winter	2.462	0.988
1 year 2880 minute summer	2.986	0.800
1 year 2880 minute winter	2.007	0.800
1 year 4320 minute summer	2.276	0.595
1 year 4320 minute winter	1.499	0.595
1 year 5760 minute summer	1.885	0.483
1 year 5760 minute winter	1.220	0.483
1 year 7200 minute summer	1.609	0.410
1 year 7200 minute winter	1.038	0.410
1 year 8640 minute summer	1.409	0.359
1 year 8640 minute winter	0.910	0.359
1 year 10080 minute summer	1.260	0.322
1 year 10080 minute winter	0.813	0.322
30 year 15 minute summer	268.706	76.035
30 year 15 minute winter	188.566	76.035
30 year 30 minute summer	174.929	49.499
30 year 30 minute winter	122.757	49.499
30 year 60 minute summer	116.589	30.811
30 year 60 minute winter	77.459	30.811
30 year 120 minute summer	70.438	18.615
30 year 120 minute winter	46.797	18.615
30 year 180 minute summer	53.298	13.715
30 year 180 minute winter	34.645	13.715

Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
30 year 240 minute summer	41.604	10.995
30 year 240 minute winter	27.641	10.995
30 year 360 minute summer	31.221	8.034
30 year 360 minute winter	20.295	8.034
30 year 480 minute summer	24.324	6.428
30 year 480 minute winter	16.160	6.428
30 year 600 minute summer	19.756	5.404
30 year 600 minute winter	13.498	5.404
30 year 720 minute summer	17.490	4.687
30 year 720 minute winter	11.754	4.687
30 year 960 minute summer	14.215	3.743
30 year 960 minute winter	9.416	3.743
30 year 1440 minute summer	10.161	2.723
30 year 1440 minute winter	6.829	2.723
30 year 2160 minute summer	7.160	1.979
30 year 2160 minute winter	4.933	1.979
30 year 2880 minute summer	5.883	1.577
30 year 2880 minute winter	3.953	1.577
30 year 4320 minute summer	4.374	1.143
30 year 4320 minute winter	2.880	1.143
30 year 5760 minute summer	3.554	0.910
30 year 5760 minute winter	2.301	0.910
30 year 7200 minute summer	2.987	0.762
30 year 7200 minute winter	1.928	0.762
30 year 8640 minute summer	2.583	0.659
30 year 8640 minute winter	1.667	0.659
30 year 10080 minute summer	2.284	0.583
30 year 10080 minute winter	1.474	0.583
100 year +40% CC 15 minute summer	488.233	138.153
100 year +40% CC 15 minute winter	342.620	138.153
100 year +40% CC 30 minute summer	320.551	90.705
100 year +40% CC 30 minute winter	224.948	90.705
100 year +40% CC 60 minute summer	214.603	56.713
100 year +40% CC 60 minute winter	142.577	56.713
100 year +40% CC 120 minute summer	129.587	34.246
100 year +40% CC 120 minute winter	86.094	34.246
100 year +40% CC 180 minute summer	97.729	25.149
100 year +40% CC 180 minute winter	63.526	25.149
100 year +40% CC 240 minute summer	75.977	20.078
100 year +40% CC 240 minute winter	50.477	20.078
100 year +40% CC 360 minute summer	56.677	14.585
100 year +40% CC 360 minute winter	36.841	14.585
100 year +40% CC 480 minute summer	43.979	11.622
100 year +40% CC 480 minute winter	29.219	11.622
100 year +40% CC 600 minute summer	35.604	9.738
100 year +40% CC 600 minute winter	24.327	9.738
100 year +40% CC 720 minute summer	31.433	8.424
100 year +40% CC 720 minute winter	21.125	8.424
100 year +40% CC 960 minute summer	25.432	6.697
100 year +40% CC 960 minute winter	16.847	6.697
100 year +40% CC 1440 minute summer	18.055	4.839
100 year +40% CC 1440 minute winter	12.134	4.839

Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
100 year +40% CC 2160 minute summer	12.630	3.490
100 year +40% CC 2160 minute winter	8.702	3.490
100 year +40% CC 2880 minute summer	10.319	2.766
100 year +40% CC 2880 minute winter	6.935	2.766
100 year +40% CC 4320 minute summer	7.609	1.989
100 year +40% CC 4320 minute winter	5.011	1.989
100 year +40% CC 5760 minute summer	6.145	1.573
100 year +40% CC 5760 minute winter	3.978	1.573
100 year +40% CC 7200 minute summer	5.137	1.311
100 year +40% CC 7200 minute winter	3.316	1.311
100 year +40% CC 8640 minute summer	4.424	1.129
100 year +40% CC 8640 minute winter	2.855	1.129
100 year +40% CC 10080 minute summer	3.897	0.994
100 year +40% CC 10080 minute winter	2.515	0.994

Results for 1 year Critical Storm Duration. Lowest mass balance: 75.76%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	EX COMINED MH 6908	13	17.608	0.018	2.0	0.0000	0.0000	OK
180 minute summer	SW MH 01.00	84	18.643	0.023	2.0	0.0041	0.0000	OK
60 minute winter	TANK	46	13.964	0.164	5.2	4.2304	0.0000	SURCHARGED
15 minute winter	SW MH 06.00	10	15.309	0.034	2.0	0.0149	0.0000	OK
15 minute winter	SW MH 05.00	11	15.121	0.047	4.0	0.0190	0.0000	OK
15 minute winter	FW CW 01.00	13	18.189	0.019	2.0	0.0265	0.0000	OK
60 minute winter	SW MH 02.00	46	13.963	0.213	2.5	0.2416	0.0000	SURCHARGED
15 minute winter	SW MH 04.00	11	14.988	0.076	7.8	0.1016	0.0000	OK
15 minute winter	SW MH 03.00	11	14.923	0.076	7.8	0.0857	0.0000	OK
15 minute winter	SW MH 07.00	10	15.301	0.026	2.0	0.0113	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
180 minute summer	SW MH 01.00	1.006	FW CW 01.00	2.0	1.814	0.039	0.0074	
60 minute winter	TANK	1.004	SW MH 02.00	2.5	0.591	0.128	0.0745	
15 minute winter	SW MH 06.00	1.000	SW MH 05.00	2.0	0.513	0.110	0.0772	
15 minute winter	SW MH 05.00	1.001	SW MH 04.00	3.9	0.569	0.218	0.1113	
15 minute winter	FW CW 01.00	1.007	EX COMINED MH 6908	2.0	1.676	0.030	0.0049	4.3
60 minute winter	SW MH 02.00	Pump	SW MH 01.00	2.0				
15 minute winter	SW MH 04.00	1.002	SW MH 03.00	7.8	0.867	0.439	0.0586	
15 minute winter	SW MH 03.00	1.003	TANK	7.8	0.937	0.421	0.0361	
15 minute winter	SW MH 07.00	2.000	SW MH 04.00	2.0	0.394	0.063	0.0634	

Results for 30 year Critical Storm Duration. Lowest mass balance: 75.76%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute winter	EX COMINED MH 6908	24	17.608	0.018	2.0	0.0000	0.0000	OK
360 minute summer	SW MH 01.00	112	18.644	0.024	2.0	0.0042	0.0000	OK
120 minute winter	TANK	94	14.306	0.506	7.8	13.0396	0.0000	SURCHARGED
15 minute winter	SW MH 06.00	10	15.328	0.053	4.8	0.0235	0.0000	OK
15 minute winter	SW MH 05.00	10	15.151	0.077	9.6	0.0310	0.0000	OK
30 minute summer	FW CW 01.00	16	18.189	0.019	2.0	0.0265	0.0000	OK
120 minute winter	SW MH 02.00	94	14.305	0.555	2.4	0.6280	0.0000	SURCHARGED
15 minute winter	SW MH 04.00	11	15.099	0.187	19.0	0.2488	0.0000	SURCHARGED
15 minute winter	SW MH 03.00	11	15.001	0.154	18.1	0.1742	0.0000	SURCHARGED
15 minute winter	SW MH 07.00	10	15.314	0.039	4.8	0.0175	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
360 minute summer	SW MH 01.00	1.006	FW CW 01.00	2.1	1.732	0.041	0.0074	
120 minute winter	TANK	1.004	SW MH 02.00	2.4	0.565	0.124	0.0745	
15 minute winter	SW MH 06.00	1.000	SW MH 05.00	4.8	0.649	0.267	0.1471	
15 minute winter	SW MH 05.00	1.001	SW MH 04.00	9.4	0.657	0.529	0.2159	
30 minute summer	FW CW 01.00	1.007	EX COMINED MH 6908	2.0	1.675	0.030	0.0048	13.1
120 minute winter	SW MH 02.00	Pump	SW MH 01.00	2.0				
15 minute winter	SW MH 04.00	1.002	SW MH 03.00	18.1	1.031	1.025	0.1151	
15 minute winter	SW MH 03.00	1.003	TANK	17.9	1.098	0.969	0.0717	
15 minute winter	SW MH 07.00	2.000	SW MH 04.00	4.8	0.448	0.151	0.1233	

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 75.76%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
240 minute winter	EX COMINED MH 6908	48	17.608	0.018	2.0	0.0000	0.0000	OK
15 minute summer	SW MH 01.00	8	18.643	0.023	2.0	0.0040	0.0000	OK
120 minute winter	TANK	118	14.928	1.128	14.6	29.0972	0.0000	SURCHARGED
15 minute winter	SW MH 06.00	12	15.573	0.298	8.8	0.1321	0.0000	SURCHARGED
15 minute winter	SW MH 05.00	12	15.532	0.458	16.0	0.1835	0.0000	SURCHARGED
240 minute winter	FW CW 01.00	48	18.189	0.019	2.0	0.0265	0.0000	OK
120 minute winter	SW MH 02.00	118	14.927	1.177	2.5	1.3323	0.0000	SURCHARGED
15 minute winter	SW MH 04.00	12	15.396	0.484	30.0	0.6437	0.0000	SURCHARGED
15 minute winter	SW MH 03.00	12	15.137	0.290	29.2	0.3281	0.0000	SURCHARGED
15 minute winter	SW MH 07.00	12	15.420	0.145	8.8	0.0644	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	SW MH 01.00	1.006	FW CW 01.00	2.2	1.618	0.042	0.0074	
120 minute winter	TANK	1.004	SW MH 02.00	2.5	0.644	0.131	0.0745	
15 minute winter	SW MH 06.00	1.000	SW MH 05.00	7.7	0.675	0.432	0.3527	
15 minute winter	SW MH 05.00	1.001	SW MH 04.00	14.8	0.842	0.833	0.2841	
240 minute winter	FW CW 01.00	1.007	EX COMINED MH 6908	2.0	1.677	0.030	0.0049	49.3
120 minute winter	SW MH 02.00	Pump	SW MH 01.00	2.0				
15 minute winter	SW MH 04.00	1.002	SW MH 03.00	29.2	1.658	1.649	0.1151	
15 minute winter	SW MH 03.00	1.003	TANK	29.2	1.661	1.581	0.0755	
15 minute winter	SW MH 07.00	2.000	SW MH 04.00	8.2	0.598	0.258	0.2028	