

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	1	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	✓

Adoptable Manhole Type

Max Width (mm)	Diameter (mm)	Max Width (mm)	Diameter (mm)
374	1200	749	1500
499	1350	900	1800

>900 Link+900 mm

Max Depth (m)	Diameter (mm)	Max Depth (m)	Diameter (mm)
1.500	1050	99.999	1200

Circular Link Type

Shape	Circular	Auto Increment (mm)	75
Barrels	1	Follow Ground	x

Available Diameters (mm)

100 | 150

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
RE1	0.007	5.00	53.350	450	5399.214	1246.715	0.550
S1	0.007	5.00	53.350	450	5399.214	1233.244	0.750
S2	0.007	5.00	53.350	450	5412.542	1233.244	0.900
RE2	0.007	5.00	53.350	450	5412.542	1246.715	0.550
EXMH			53.350	450	5413.414	1230.479	0.950

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)
1.000	RE1	S1	13.471	0.600	52.800	52.600	0.200	67.4	100	5.24	50.0
1.001	S1	S2	13.328	0.600	52.600	52.450	0.150	88.9	100	5.51	50.0
1.002	S2	EXMH	2.899	0.600	52.450	52.400	0.050	58.0	100	5.56	50.0
2.000	RE2	S2	13.471	0.600	52.800	52.450	0.350	38.5	100	5.18	50.0

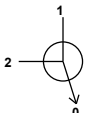
Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.000	0.939	7.4	0.9	0.450	0.650	0.007	0.0	25	0.650
1.001	0.816	6.4	1.9	0.650	0.800	0.014	0.0	37	0.709
1.002	1.013	8.0	3.8	0.800	0.850	0.028	0.0	49	1.003
2.000	1.247	9.8	0.9	0.450	0.800	0.007	0.0	21	0.779

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)
1.000	13.471	67.4	100	Circular	53.350	52.800	0.450	53.350	52.600	0.650
1.001	13.328	88.9	100	Circular	53.350	52.600	0.650	53.350	52.450	0.800
1.002	2.899	58.0	100	Circular	53.350	52.450	0.800	53.350	52.400	0.850
2.000	13.471	38.5	100	Circular	53.350	52.800	0.450	53.350	52.450	0.800

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	RE1	450	Manhole	Adoptable	S1	450	Manhole	Adoptable
1.001	S1	450	Manhole	Adoptable	S2	450	Manhole	Adoptable
1.002	S2	450	Manhole	Adoptable	EXMH	450	Manhole	Adoptable
2.000	RE2	450	Manhole	Adoptable	S2	450	Manhole	Adoptable

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
RE1	5399.214	1246.715	53.350	0.550	450				
S1	5399.214	1233.244	53.350	0.750	450		1.000	52.800	100
S2	5412.542	1233.244	53.350	0.900	450		1.001	52.600	100
RE2	5412.542	1246.715	53.350	0.550	450		2.000	52.450	100
EXMH	5413.414	1230.479	53.350	0.950	450		1.002	52.400	100

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	30	60	120	180	240	360	480	600	720	960	1440
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Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	0	0	0
30	0	0	0
100	0	0	0
100	40	0	0

Node S2 Online Orifice Control

Flap Valve	x	Design Depth (m)	1.000	Discharge Coefficient	0.600
Replaces Downstream Link	✓	Design Flow (l/s)	1.0		
Invert Level (m)	52.450	Diameter (m)	0.021		

Node RE1 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	52.800	Slope (1:X)	500.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	8	Depth (m)	
Safety Factor	2.0	Width (m)	6.000	Inf Depth (m)	0.200
Porosity	0.33	Length (m)	6.000		

Node RE2 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	52.800	Slope (1:X)	500.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	8	Depth (m)	
Safety Factor	2.0	Width (m)	6.000	Inf Depth (m)	0.200
Porosity	0.33	Length (m)	6.000		

Node S1 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	52.600	Slope (1:X)	500.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	152	Depth (m)	
Safety Factor	2.0	Width (m)	6.000	Inf Depth (m)	0.200
Porosity	0.33	Length (m)	6.000		

Node S2 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	52.450	Slope (1:X)	500.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	228	Depth (m)	
Safety Factor	2.0	Width (m)	6.000	Inf Depth (m)	0.200
Porosity	0.33	Length (m)	6.000		

Other (defaults)

Entry Loss (manhole)	0.250	Entry Loss (junction)	0.000	Apply Recommended Losses	x
Exit Loss (manhole)	0.250	Exit Loss (junction)	0.000	Flood Risk (m)	0.300

Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)	Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
1 year 15 minute summer	109.521	30.991	1 year 120 minute summer	30.053	7.942
1 year 15 minute winter	76.857	30.991	1 year 120 minute winter	19.966	7.942
1 year 30 minute summer	71.439	20.215	1 year 180 minute summer	23.233	5.979
1 year 30 minute winter	50.133	20.215	1 year 180 minute winter	15.102	5.979
1 year 60 minute summer	48.435	12.800	1 year 240 minute summer	18.475	4.882
1 year 60 minute winter	32.179	12.800	1 year 240 minute winter	12.274	4.882

Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)	Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
1 year 360 minute summer	14.169	3.646	100 year 120 minute summer	92.562	24.461
1 year 360 minute winter	9.210	3.646	100 year 120 minute winter	61.496	24.461
1 year 480 minute summer	11.185	2.956	100 year 180 minute summer	69.806	17.964
1 year 480 minute winter	7.431	2.956	100 year 180 minute winter	45.376	17.964
1 year 600 minute summer	9.182	2.511	100 year 240 minute summer	54.269	14.342
1 year 600 minute winter	6.274	2.511	100 year 240 minute winter	36.055	14.342
1 year 720 minute summer	8.203	2.199	100 year 360 minute summer	40.484	10.418
1 year 720 minute winter	5.513	2.199	100 year 360 minute winter	26.315	10.418
1 year 960 minute summer	6.768	1.782	100 year 480 minute summer	31.414	8.302
1 year 960 minute winter	4.483	1.782	100 year 480 minute winter	20.871	8.302
1 year 1440 minute summer	4.949	1.326	100 year 600 minute summer	25.431	6.956
1 year 1440 minute winter	3.326	1.326	100 year 600 minute winter	17.376	6.956
30 year 15 minute summer	268.706	76.035	100 year 720 minute summer	22.452	6.017
30 year 15 minute winter	188.566	76.035	100 year 720 minute winter	15.089	6.017
30 year 30 minute summer	174.929	49.499	100 year 960 minute summer	18.166	4.784
30 year 30 minute winter	122.757	49.499	100 year 960 minute winter	12.033	4.784
30 year 60 minute summer	116.589	30.811	100 year 1440 minute summer	12.896	3.456
30 year 60 minute winter	77.459	30.811	100 year 1440 minute winter	8.667	3.456
30 year 120 minute summer	70.438	18.615	100 year +40% CC 15 minute summer	488.233	138.153
30 year 120 minute winter	46.797	18.615	100 year +40% CC 15 minute winter	342.620	138.153
30 year 180 minute summer	53.298	13.715	100 year +40% CC 30 minute summer	320.551	90.705
30 year 180 minute winter	34.645	13.715	100 year +40% CC 30 minute winter	224.948	90.705
30 year 240 minute summer	41.604	10.995	100 year +40% CC 60 minute summer	214.603	56.713
30 year 240 minute winter	27.641	10.995	100 year +40% CC 60 minute winter	142.577	56.713
30 year 360 minute summer	31.221	8.034	100 year +40% CC 120 minute summer	129.587	34.246
30 year 360 minute winter	20.295	8.034	100 year +40% CC 120 minute winter	86.094	34.246
30 year 480 minute summer	24.324	6.428	100 year +40% CC 180 minute summer	97.729	25.149
30 year 480 minute winter	16.160	6.428	100 year +40% CC 180 minute winter	63.526	25.149
30 year 600 minute summer	19.756	5.404	100 year +40% CC 240 minute summer	75.977	20.078
30 year 600 minute winter	13.498	5.404	100 year +40% CC 240 minute winter	50.477	20.078
30 year 720 minute summer	17.490	4.687	100 year +40% CC 360 minute summer	56.677	14.585
30 year 720 minute winter	11.754	4.687	100 year +40% CC 360 minute winter	36.841	14.585
30 year 960 minute summer	14.215	3.743	100 year +40% CC 480 minute summer	43.979	11.622
30 year 960 minute winter	9.416	3.743	100 year +40% CC 480 minute winter	29.219	11.622
30 year 1440 minute summer	10.161	2.723	100 year +40% CC 600 minute summer	35.604	9.738
30 year 1440 minute winter	6.829	2.723	100 year +40% CC 600 minute winter	24.327	9.738
100 year 15 minute summer	348.738	98.681	100 year +40% CC 720 minute summer	31.433	8.424
100 year 15 minute winter	244.728	98.681	100 year +40% CC 720 minute winter	21.125	8.424
100 year 30 minute summer	228.965	64.789	100 year +40% CC 960 minute summer	25.432	6.697
100 year 30 minute winter	160.677	64.789	100 year +40% CC 960 minute winter	16.847	6.697
100 year 60 minute summer	153.288	40.510	100 year +40% CC 1440 minute summer	18.055	4.839
100 year 60 minute winter	101.841	40.510	100 year +40% CC 1440 minute winter	12.134	4.839

Results for 1 year Critical Storm Duration. Lowest mass balance: 99.40%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	RE1	13	52.821	0.021	1.0	0.1834	0.0000	OK
15 minute winter	S1	13	52.629	0.029	1.5	0.2837	0.0000	OK
120 minute winter	S2	114	52.620	0.170	1.2	2.0084	0.0000	SURCHARGED
15 minute winter	RE2	12	52.819	0.019	1.0	0.1599	0.0000	OK
15 minute summer	EXMH	1	52.400	0.000	0.3	0.0000	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 winter	RE1	1.000	S1	0.7	0.470	0.094	0.0205	
15 minute winter	S1	1.001	S2	1.2	0.369	0.183	0.0621	
120 minute winter	S2	Orifice	EXMH	0.4				3.9
15 minute winter	RE2	2.000	S2	0.7	0.387	0.076	0.0567	

Results for 30 year Critical Storm Duration. Lowest mass balance: 99.40%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	RE1	12	52.835	0.035	2.4	0.3636	0.0000	OK
180 minute winter	S1	140	52.779	0.179	1.2	2.1164	0.0000	SURCHARGED
180 minute winter	S2	140	52.779	0.329	1.7	3.9364	0.0000	SURCHARGED
15 minute winter	RE2	12	52.831	0.031	2.4	0.3128	0.0000	OK
15 minute summer	EXMH	1	52.400	0.000	0.4	0.0000	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 winter	RE1	1.000	S1	2.0	0.612	0.268	0.0536	
180 minute winter	S1	1.001	S2	0.8	0.224	0.126	0.1043	
180 minute winter	S2	Orifice	EXMH	0.5				9.1
15 minute winter	RE2	2.000	S2	2.1	0.435	0.211	0.0667	

Results for 100 year Critical Storm Duration. Lowest mass balance: 99.40%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
120 minute winter	RE1	116	52.842	0.042	1.0	0.4415	0.0000	OK
120 minute winter	S1	116	52.842	0.242	2.0	2.8832	0.0000	SURCHARGED
120 minute winter	S2	116	52.841	0.391	2.7	4.7006	0.0000	SURCHARGED
120 minute winter	RE2	116	52.841	0.041	1.0	0.4372	0.0000	OK
15 minute summer	EXMH	1	52.400	0.000	0.5	0.0000	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)
120 minute winter	RE1	1.000	S1	1.0	0.431	0.134	0.0735	
120 minute winter	S1	1.001	S2	1.2	0.256	0.190	0.1043	
120 minute winter	S2	Orifice	EXMH	0.6				9.4
120 minute winter	RE2	2.000	S2	1.0	0.261	0.101	0.0732	

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.40%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
180 minute winter	RE1	172	52.929	0.129	1.0	1.5182	0.0000	SURCHARGED
180 minute winter	S1	172	52.929	0.329	2.0	3.9533	0.0000	SURCHARGED
180 minute winter	S2	172	52.929	0.479	2.2	5.7671	0.0000	SURCHARGED
180 minute winter	RE2	172	52.929	0.129	1.0	1.5129	0.0000	SURCHARGED
15 minute summer	EXMH	1	52.400	0.000	0.5	0.0000	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 winter	RE1	1.000	S1	1.0	0.375	0.135	0.1054	
180 minute winter	S1	1.001	S2	0.8	0.244	0.117	0.1043	
180 minute winter	S2	Orifice	EXMH	0.6				12.7
180 minute winter	RE2	2.000	S2	1.0	0.237	0.101	0.1054	