

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 Inverts
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)
5	0.010	5.00	6.030		1206.799	174.226	0.380
4	0.003	5.00	6.030		1208.955	160.635	0.580
SW04			6.030	450	1207.231	164.630	0.830
SW03			5.580	500	1207.806	174.572	0.711
SW02			5.300	600	1207.632	177.073	1.090
6		5.00	6.030		1210.663	157.814	0.580

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)
SW03	SW03	SW02	2.507	0.600	4.869	4.210	0.659	3.8	100	5.22	50.0
5	5	SW03	1.065	0.600	5.650	4.869	0.781	1.4	100	5.00	50.0
SW04	SW04	SW03	9.959	0.600	5.200	4.869	0.331	30.1	100	5.21	50.0
4	4	SW04	4.351	0.600	5.450	5.200	0.250	17.4	100	5.09	50.0
6	6	4	3.298	0.600	5.450	5.450	0.000	0.0	100	5.05	50.0

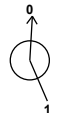
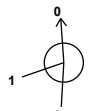
Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
SW03	3.993	31.4	4.9	0.611	0.990	0.037	0.0	27	2.923
5	6.678	52.5	1.4	0.280	0.611	0.010	0.0	11	2.867
SW04	1.412	11.1	3.5	0.730	0.611	0.026	0.0	39	1.253
4	1.860	14.6	3.5	0.480	0.730	0.026	0.0	33	1.526
6	1.000	7.9	3.1	0.480	0.480	0.023	0.0	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)
SW03	2.507	3.8	100	Circular	5.580	4.869	0.611	5.300	4.210	0.990
5	1.065	1.4	100	Circular	6.030	5.650	0.280	5.580	4.869	0.611
SW04	9.959	30.1	100	Circular	6.030	5.200	0.730	5.580	4.869	0.611
4	4.351	17.4	100	Circular	6.030	5.450	0.480	6.030	5.200	0.730
6	3.298	0.0	100	Circular	6.030	5.450	0.480	6.030	5.450	0.480

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
SW03	SW03	500	Manhole	Adoptable	SW02	600	Manhole	Adoptable
5	5		Junction		SW03	500	Manhole	Adoptable
SW04	SW04	450	Manhole	Adoptable	SW03	500	Manhole	Adoptable
4	4		Junction		SW04	450	Manhole	Adoptable
6	6		Junction		4		Junction	

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
5	1206.799	174.226	6.030	0.380					
						0	5	5.650	100
4	1208.955	160.635	6.030	0.580			1	6	5.450
						0	4	5.450	100
SW04	1207.231	164.630	6.030	0.830	450		1	4	5.200
						0	SW04	5.200	100
SW03	1207.806	174.572	5.580	0.711	500		1	5	4.869
						2	SW04	4.869	100
						0	SW03	4.869	100
SW02	1207.632	177.073	5.300	1.090	600		1	SW03	4.210
6	1210.663	157.814	6.030	0.580					
						0	6	5.450	100

Simulation Settings

Rainfall Methodology	FSR	Analysis Speed	Normal	10 year (l/s)	0.4
FSR Region	England and Wales	Skip Steady State	x	30 year (l/s)	0.6
M5-60 (mm)	20.000	Drain Down Time (mins)	240	100 year (l/s)	0.8
Ratio-R	0.400	Additional Storage (m³/ha)	20.0	500 year (l/s)	1.1
Summer CV	0.750	Check Discharge Rate(s)	✓	Check Discharge Volume	✓
Winter CV	0.840	1 year (l/s)	0.2	100 year 360 minute (m³)	

Storm Durations							
15 30 60 120 180 240 360 480 600 720 960 1440							
Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)	Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	10	0	0	100	40	0	0
10	20	0	0	500	40	0	0
30	20	0	0				

Pre-development Discharge Rate

Site Makeup	Greenfield	SPR	0.40	Growth Factor 100 year	3.19	Q 10 year (l/s)	0.4
Greenfield Method	IH124	Region	7	Growth Factor 500 year	4.49	Q 30 year (l/s)	0.6
Positively Drained Area (ha)	0.069	Growth Factor 1 year	0.85	Betterment (%)	0	Q 100 year (l/s)	0.8
SAAR (mm)	722	Growth Factor 10 year	1.62	QBar	0.2	Q 500 year (l/s)	1.1
Soil Index	3	Growth Factor 30 year	2.40	Q 1 year (l/s)	0.2		

Pre-development Discharge Volume

Site Makeup	Greenfield	Soil Index	3	Return Period (years)	100	Betterment (%)	0
Greenfield Method	FSR/FEH	SPR	0.40	Climate Change (%)	0	PR	
Positively Drained Area (ha)	0.069	CWI		Storm Duration (mins)	360	Runoff Volume (m³)	

Node SW03 Online Orifice Control

Flap Valve	x	Invert Level (m)	4.869	Design Flow (l/s)	2.0	Discharge Coefficient	0.600
Replaces Downstream Link	✓	Design Depth (m)	0.330	Diameter (m)	0.041		

Node SW04 Online Orifice Control

Flap Valve	x	Invert Level (m)	5.200	Design Flow (l/s)	0.5	Discharge Coefficient	0.600
Replaces Downstream Link	✓	Design Depth (m)	0.400	Diameter (m)	0.019		

Node 5 Online Orifice Control

Flap Valve	x	Invert Level (m)	5.650	Design Flow (l/s)	0.4	Discharge Coefficient	0.600
Replaces Downstream Link	✓	Design Depth (m)	0.200	Diameter (m)	0.020		

Node 4 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Width (m)	5.380	Depth (m)	
Side Inf Coefficient (m/hr)	0.00000	Invert Level (m)	5.450	Length (m)	5.380	Inf Depth (m)	0.400
Safety Factor	2.0	Time to half empty (mins)	0	Slope (1:X)	1000.0		

Node 5 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Porosity	0.30	Width (m)	10.340	Depth (m)	
Side Inf Coefficient (m/hr)	0.00000	Invert Level (m)	5.650	Length (m)	10.340	Inf Depth (m)	0.200
Safety Factor	2.0	Time to half empty (mins)	0	Slope (1:X)	1000.0		

Results for 1 year +10% CC Critical Storm Duration. Lowest mass balance: 95.99%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
180 minute winter	5	132	5.689	0.039	0.4	1.0722	0.0000	OK
60 minute winter	4	50	5.515	0.065	3.5	1.6145	0.0000	OK
60 minute winter	SW04	50	5.515	0.315	1.2	0.0501	0.0000	SURCHARGED
180 minute winter	SW03	132	4.914	0.045	0.6	0.0089	0.0000	OK
15 minute summer	SW02	1	4.210	0.000	0.5	0.0000	0.0000	OK
15 minute winter	6	10	5.533	0.083	0.3	0.0000	0.0000	OK
15 minute winter	6:50%	10	5.533	0.083	3.7	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	5	Orifice	SW03	0.1				
60 minute winter	4	4	SW04	1.2	0.446	0.081	0.0288	
60 minute winter	SW04	Orifice	SW03	0.4				
180 minute winter	SW03	Orifice	SW02	0.6				6.2
15 minute winter	6	6	6:50%	0.5	-0.260	0.067	0.0114	
15 minute winter	6	6	4	5.8	1.327	0.741	0.0074	

Results for 10 year +20% CC Critical Storm Duration. Lowest mass balance: 95.99%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
120 minute winter	5	96	5.724	0.074	1.1	2.1852	0.0000	OK
120 minute winter	4	112	5.617	0.167	2.5	4.2783	0.0000	SURCHARGED
120 minute winter	SW04	112	5.617	0.417	1.2	0.0663	0.0000	SURCHARGED
120 minute winter	SW03	104	4.928	0.059	0.7	0.0116	0.0000	OK
15 minute summer	SW02	1	4.210	0.000	0.6	0.0000	0.0000	OK
120 minute winter	6	110	5.617	0.167	0.1	0.0000	0.0000	SURCHARGED
120 minute winter	6:50%	112	5.617	0.167	2.3	0.0000	0.0000	SURCHARGED

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	5	Orifice	SW03	0.2				
120 minute winter	4	4	SW04	1.2	0.432	0.082	0.0340	
120 minute winter	SW04	Orifice	SW03	0.5				
120 minute winter	SW03	Orifice	SW02	0.7				10.4
120 minute winter	6	6	6:50%	-0.1	-0.175	-0.013	0.0129	
120 minute winter	6	6	4	2.2	0.621	0.274	0.0129	

Results for 30 year +20% CC Critical Storm Duration. Lowest mass balance: 95.99%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
120 minute winter	5	102	5.746	0.096	1.4	2.8870	0.0000	OK
120 minute winter	4	116	5.681	0.231	3.2	5.9627	0.0000	SURCHARGED
120 minute winter	SW04	116	5.681	0.481	1.4	0.0765	0.0000	SURCHARGED
120 minute winter	SW03	106	4.937	0.068	0.8	0.0132	0.0000	OK
15 minute summer	SW02	1	4.210	0.000	0.6	0.0000	0.0000	OK
120 minute winter	6	116	5.681	0.231	0.1	0.0000	0.0000	SURCHARGED
120 minute winter	6:50%	116	5.681	0.231	3.0	0.0000	0.0000	SURCHARGED

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	5	Orifice	SW03	0.2				
120 minute winter	4	4	SW04	1.4	0.469	0.098	0.0340	
120 minute winter	SW04	Orifice	SW03	0.5				
120 minute winter	SW03	Orifice	SW02	0.8				12.6
120 minute winter	6	6	6:50%	-0.1	-0.175	-0.016	0.0129	
120 minute winter	6	6	4	2.8	0.658	0.356	0.0129	

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 95.99%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
120 minute winter	5	114	5.802	0.152	2.1	4.6881	0.0000	FLOOD RISK
120 minute winter	4	118	5.842	0.392	4.9	10.2497	0.0000	FLOOD RISK
120 minute winter	SW04	118	5.841	0.641	1.2	0.1020	0.0000	FLOOD RISK
120 minute winter	SW03	118	4.957	0.088	0.9	0.0173	0.0000	OK
15 minute summer	SW02	1	4.210	0.000	0.7	0.0000	0.0000	OK
180 minute winter	6	172	5.842	0.392	0.1	0.0000	0.0000	FLOOD RISK
120 minute winter	6:50%	118	5.842	0.392	4.6	0.0000	0.0000	SURCHARGED

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	5	Orifice	SW03	0.3				
120 minute winter	4	4	SW04	1.2	0.508	0.083	0.0340	
120 minute winter	SW04	Orifice	SW03	0.6				
120 minute winter	SW03	Orifice	SW02	0.9				15.5
180 minute winter	6	6	6:50%	-0.1	-0.166	-0.015	0.0129	
180 minute winter	6	6	4	3.2	0.617	0.404	0.0129	

Results for 500 year +40% CC Critical Storm Duration. Lowest mass balance: 95.99%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
180 minute winter	5	168	5.873	0.223	2.2	6.9437	0.0000	FLOOD RISK
180 minute winter	4	140	6.030	0.580	5.1	15.3781	0.7595	FLOOD
120 minute winter	SW04	104	6.029	0.829	1.6	0.1319	0.0000	FLOOD RISK
180 minute winter	SW03	168	4.982	0.113	1.1	0.0222	0.0000	SURCHARGED
15 minute summer	SW02	1	4.210	0.000	0.8	0.0000	0.0000	OK
120 minute winter	6	102	6.030	0.580	0.2	0.0000	0.0000	FLOOD RISK
120 minute winter	6:50%	108	6.031	0.581	6.6	0.0248	0.0000	PONDING

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	5	Orifice	SW03	0.4				
180 minute winter	4	4	SW04	1.5	0.375	0.101	0.0340	
120 minute winter	SW04	Orifice	SW03	0.7				
180 minute winter	SW03	Orifice	SW02	1.1				21.2
120 minute winter	6	6	6:50%	-0.2	-0.209	-0.031	0.0129	
120 minute winter	6	6	4	6.1	0.850	0.781	0.0129	