Rainfall Methodology	FSR
Return Period (years)	2
Additional Flow (%)	0
FSR Region	England and Wales
M5-60 (mm)	19.000
Ratio-R	0.352
CV	0.750
Time of Entry (mins)	5.00
Maximum Time of Concentration (mins)	30.00
Maximum Rainfall (mm/hr)	50.0
Minimum Velocity (m/s)	1.00
Connection Type	Level Soffits
Minimum Backdrop Height (m)	0.500
Preferred Cover Depth (m)	1.200
Enforce best practice design rules	

Copyright © 1988-2018 Causeway Software Solutions Limited

	Name	Area (ha)	T of E (mins)	Add Inflow (l/s)	Cover Level (m)	Node Type	Manhole Type	Diameter (mm)	Width (mm)	Easting (m)	Northing (m)	Depth (m)	Notes
	3	0.045	5.00		44.350	Manhole	1 STANDARD	1200		-352.842	2857.752	1.500	
	2	0.045	5.00		44.350	Manhole	1 STANDARD	1200		-341.429	2857.752	1.620	
	2_OUT				44.350	Manhole	1 STANDARD			-332.829	2857.752	1.751	

Copyright © 1988-2018 Causeway Software Solutions Limited

	Name	US Node	DS Node	Length (m)	ks (mm) / n	Velocity Equation	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	Link Type	T of C (mins)	Rain (mm/hr)	Con Offset (m)	Min DS IL (m)	Lateral Area (ha)	Lateral Ins Point (%)	Lateral T of E (mins)
	1.000	3	2	11.413	0.600	Colebrook-White	42.850	42.730	0.120	95.1	150	1 STANDARD	5.18	50.0					
	1.001	2	2_OUT	8.600	0.600	Colebrook-White	42.730	42.599	0.131	65.6	150	1 STANDARD	5.30	50.0					

Copyright © 1988-2018 Causeway Software Solutions Limited

	Name	US Node	DS Node	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Minimum Depth (m)	Maximum Depth (m)	Σ Area (ha)	Σ Add Inflow (ha)	Pro Depth (mm)	Pro Velocity (m/s)	Notes
	1.000	3	2	1.030	18.2	6.1	1.350	1.470	1.350	1.470	0.045	0.0			
	1.001	2	2_OUT	1.243	22.0	12.2	1.470	1.601	1.470	1.601	0.090	0.0			

Copyright © 1988-2018 Causeway Software Solutions Limited

Link Name	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)	US Node Name	Dia (mm)	Width (mm)	Node Type	MH Type	DS Node Name	Dia (mm)	Width (mm)	Node Type	MH Type
1.000	11.413	95.1	150	1 STANDARD	44.350	42.850	1.350	44.350	42.730	1.470	3	1200		Manhole	1 STANDARD	2	1200		Manhole	1 STANDARD
1.001	8.600	65.6	150	1 STANDARD	44.350	42.730	1.470	44.350	42.599	1.601	2	1200		Manhole	1 STANDARD	2_OUT			Manhole	1 STANDARD

Copyright © 1988-2018 Causeway Software Solutions Limited

Node Name	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Width (mm)	Node Type	MH Type		Link ID	IL (m)	Dia (mm)	Link Type
3	-352.842	2857.752	44.350	1.500	1200		Manhole	1 STANDARD					
									0	1.000	42.850	150	1 STANDARD
2	-341.429	2857.752	44.350	1.620	1200		Manhole	1 STANDARD	1	1.000	42.730	150	1 STANDARD
									0	1.001	42.730	150	1 STANDARD
2_OUT	-332.829	2857.752	44.350	1.751			Manhole	1 STANDARD	1	1.001	42.599	150	1 STANDARD

Copyright © 1988-2018 Causeway Software Solutions Limited

Rainfall Methodology	FSR		**Return Period (years)**	**Climate Change (%)**
FSR Region	England and Wales		2	0
M5-60 (mm)	18.900		30	0
Ratio-R	0.398		100	30
Winter CV	0.840			
Analysis Speed	Normal			
Drain Down Time (mins)	240			
Additional Storage (m³/ha)	20.0			
Storm Durations (mins)	15			
	30			
	60			
	120			
	180			
	240			
	360			
	480			
	600			
	720			
	960			
	1440			
Check Discharge Rate(s)	x			
1 year (l/s)				
30 year (l/s)				
100 year (l/s)				
Check Discharge Volume	x			
100 year 360 minute (m³)				

Copyright © 1988-2018 Causeway Software Solutions Limited

Hydro-Brake®

Node	Flap Valve	Online / Offline	Downstream Link	Replaces Downstream Link	Loop to Node	Invert Level (m)	Design Depth (m)	Design Flow (l/s)	Objective	Sump Available	Product Number	Min Outlet Diameter (m)	Min Node Diameter (mm)
2	x	Online		x		42.730	1.500	5.0	(HE) Minimise upstream storage		CTL-SHE-0098-5000-1500-5000	0.150	1200

Copyright © 1988-2018 Causeway Software Solutions Limited

Depth/Area/Inf Area									
Node	Base Inf Coefficient (m/hr)	Side Inf Coefficient (m/hr)	Safety Factor	Porosity	Invert Level (m)	Time to half empty (mins)	Depth (m)	Area (m²)	Inf. Area (m²)
2	0.00000	0.00000	2.0	0.95	42.730	48	0.000	43.0	0.0
							0.660	43.0	0.0
							0.661	0.0	0.0

Copyright © 1988-2018 Causeway Software Solutions Limited

Node Size	
Node Losses	
Link Size	
Minimum Diameter (mm)	150
Link Length	
Maximum Length (m)	100.000
Coordinates	
Accuracy (m)	1.000
Crossings	
Cover Depth	
Minimum Cover Depth (m)	
Maximum Cover Depth (m)	3.000
Backdrops	
Minimum Backdrop Height (m)	
Maximum Backdrop Height (m)	1.500
Full Bore Velocity	
Minimum Full Bore Velocity (m/s)	
Maximum Full Bore Velocity (m/s)	3.000
Proportional Velocity	
Return Period (years)	
Minimum Proportional Velocity (m/s)	0.750
Maximum Proportional Velocity (m/s)	3.000
Surcharged Depth	
Return Period (years)	
Maximum Surcharged Depth (m)	0.100
Flooding	
Return Period (years)	30
Discharge Rates	
1 year (l/s)	
30 year (l/s)	
100 year (l/s)	
Discharge Volume	

Copyright © 1988-2018 Causeway Software Solutions Limited

100 year 360 minute (m³)	

Copyright © 1988-2018 Causeway Software Solutions Limited

Results for 2 year Critical Storm Duration. Lowest mass balance: 100.00%

Event	US Node ID	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status	Link ID	DS Node ID	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)
15 minute winter	3	10	42.922	0.072	7.7	0.1239	0.0000	OK	1.000	2	7.6	1.095	0.418	0.1181
60 minute winter	2	43	42.884	0.154	7.8	6.5340	0.0000	SURCHARGED	1.001	2_OUT	3.5	0.889	0.161	0.0342
60 minute winter	2_OUT	43	42.640	0.041	3.5	0.0000	0.0000	OK						

Copyright © 1988-2018 Causeway Software Solutions Limited

Results for 30 year Critical Storm Duration. Lowest mass balance: 100.00%

Event	US Node ID	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status	Link ID	DS Node ID	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)
60 minute winter	3	45	43.038	0.188	7.5	0.3247	0.0000	SURCHARGED	1.000	2	7.0	0.882	0.385	0.2009
60 minute winter	2	46	43.035	0.305	14.4	12.9779	0.0000	SURCHARGED	1.001	2_OUT	4.7	0.957	0.212	0.0419
60 minute winter	2_OUT	46	42.646	0.047	4.7	0.0000	0.0000	OK						

Copyright © 1988-2018 Causeway Software Solutions Limited

Results for 100 year +30% Critical Storm Duration. Lowest mass balance: 100.00%

Event	US Node ID	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status	Link ID	DS Node ID	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)
60 minute winter	3	51	43.320	0.470	12.8	0.8141	0.0000	SURCHARGED	1.000	2	12.0	0.977	0.658	0.2009
60 minute winter	2	52	43.318	0.588	24.8	24.9920	0.0000	SURCHARGED	1.001	2_OUT	4.9	0.969	0.223	0.0434
60 minute winter	2_OUT	38	42.647	0.048	4.9	0.0000	0.0000	OK						

Copyright © 1988-2018 Causeway Software Solutions Limited