

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	100	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)	17.000	Minimum Backdrop Height (m)	0.200
Ratio-R	0.250	Preferred Cover Depth (m)	1.200
CV	1.000	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)
S41	0.029	5.00	96.287	1350	300042.441	515362.897	1.400
S42	0.017	5.00	95.830	1350	300035.903	515339.351	1.475
S43	0.027	5.00	95.417	1350	300040.067	515317.622	1.475
S44	0.066	5.00	94.769	1350	300063.878	515292.052	1.625
S45	0.023	5.00	92.388	1350	300131.465	515285.429	1.425
S46	0.034	5.00	91.061	1350	300153.687	515268.208	1.425
S47	0.025	5.00	88.603	1350	300186.495	515229.584	1.700
S48			88.357	1200	300175.160	515217.187	1.871
S49			86.417	1200	300180.819	515201.865	1.117
S50			86.417	1350	300167.025	515168.231	1.167
S51			86.017	1350	300164.054	515154.282	1.147
S52			85.333	1350	300176.083	515140.229	0.758

Links (Results)

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	1.378	24.4	5.3	1.250	1.250	0.029	0.0	47	1.101
1.001	1.791	71.2	8.3	1.250	1.250	0.046	0.0	51	1.203
1.002	1.982	78.8	13.2	1.250	1.400	0.073	0.0	62	1.480
1.003	2.353	93.5	25.3	1.400	1.200	0.140	0.0	80	2.005
1.004	2.855	113.5	29.4	1.200	1.200	0.162	0.0	78	2.406
1.005	3.010	119.7	35.4	1.200	1.400	0.196	0.0	84	2.635
1.006	2.484	175.6	40.0	1.400	1.571	0.221	0.0	97	2.025
1.007	4.074	288.0	40.0	1.571	0.717	0.221	0.0	75	2.888
1.008	0.575	40.7	40.0	0.817	0.867	0.221	0.0	242	0.653
1.009	2.398	169.5	40.0	0.867	0.797	0.221	0.0	99	1.973
1.010	1.988	140.6	40.0	0.847	0.458	0.221	0.0	109	1.722

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	24.437	53.5	150	Circular	96.287	94.887	1.250	95.830	94.430	1.250
1.001	22.124	53.6	225	Circular	95.830	94.355	1.250	95.417	93.942	1.250
1.002	34.940	43.8	225	Circular	95.417	93.942	1.250	94.769	93.144	1.400
1.003	67.911	31.1	225	Circular	94.769	93.144	1.400	92.388	90.963	1.200
1.004	28.114	21.2	225	Circular	92.388	90.963	1.200	91.061	89.636	1.200

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	S41	1350	Manhole	Adoptable	S42	1350	Manhole	Adoptable
1.001	S42	1350	Manhole	Adoptable	S43	1350	Manhole	Adoptable
1.002	S43	1350	Manhole	Adoptable	S44	1350	Manhole	Adoptable
1.003	S44	1350	Manhole	Adoptable	S45	1350	Manhole	Adoptable
1.004	S45	1350	Manhole	Adoptable	S46	1350	Manhole	Adoptable

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	50.677	19.1	225	Circular	91.061	89.636	1.200	88.603	86.978	1.400
1.006	16.797	40.3	300	Circular	88.603	86.903	1.400	88.357	86.486	1.571
1.007	16.334	15.0	300	Circular	88.357	86.486	1.571	86.417	85.400	0.717
1.008	36.352	727.0	300	Circular	86.417	85.300	0.817	86.417	85.250	0.867
1.009	14.262	43.2	300	Circular	86.417	85.250	0.867	86.017	84.920	0.797
1.010	18.498	62.7	300	Circular	86.017	84.870	0.847	85.333	84.575	0.458

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.005	S46	1350	Manhole	Adoptable	S47	1350	Manhole	Adoptable
1.006	S47	1350	Manhole	Adoptable	S48	1200	Manhole	Adoptable
1.007	S48	1200	Manhole	Adoptable	S49	1200	Manhole	Adoptable
1.008	S49	1200	Manhole	Adoptable	S50	1350	Manhole	Adoptable
1.009	S50	1350	Manhole	Adoptable	S51	1350	Manhole	Adoptable
1.010	S51	1350	Manhole	Adoptable	S52	1350	Manhole	Adoptable

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	
S41	300042.441	515362.897	96.287	1.400	1350		0	1.000	94.887	150
S42	300035.903	515339.351	95.830	1.475	1350		1	1.000	94.430	150
S43	300040.067	515317.622	95.417	1.475	1350		0	1.001	94.355	225
S44	300063.878	515292.052	94.769	1.625	1350		1	1.002	93.942	225
S45	300131.465	515285.429	92.388	1.425	1350		0	1.003	93.144	225
S46	300153.687	515268.208	91.061	1.425	1350		1	1.004	90.963	225
S47	300186.495	515229.584	88.603	1.700	1350		0	1.005	89.636	225
S48	300175.160	515217.187	88.357	1.871	1200		1	1.006	86.978	225
S49	300180.819	515201.865	86.417	1.117	1200		0	1.007	86.486	300
S50	300167.025	515168.231	86.417	1.167	1350		1	1.008	85.400	300
							0	1.009	85.250	300

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	
S51	300164.054	515154.282	86.017	1.147	1350		1	1.009	84.920	300
							0	1.010	84.870	300
S52	300176.083	515140.229	85.333	0.758	1350		1	1.010	84.575	300

Simulation Settings

Rainfall Methodology	FSR	Analysis Speed	Normal
Rainfall Events	Singular	Skip Steady State	x
FSR Region	England and Wales	Drain Down Time (mins)	240
M5-60 (mm)	17.000	Additional Storage (m³/ha)	0.0
Ratio-R	0.250	Starting Level (m)	
Summer CV	1.000	Check Discharge Rate(s)	x
Winter CV	1.000	Check Discharge Volume	x

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 %)
2	0	0	0	100	50	10	0
30	45	10	0				

Node S51 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	x	Sump Available	✓
Invert Level (m)	84.870	Product Number	CTL-SHE-0104-4900-1000-4900
Design Depth (m)	1.000	Min Outlet Diameter (m)	0.150
Design Flow (l/s)	4.9	Min Node Diameter (mm)	1200

Node S50 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	85.250
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	80

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	181.7	0.0	0.400	277.4	0.0	0.800	382.6	0.0	1.167	487.0	0.0
0.100	204.5	0.0	0.500	302.9	0.0	0.900	410.3	0.0			
0.200	228.2	0.0	0.600	328.9	0.0	1.000	438.6	0.0			
0.300	252.6	0.0	0.700	355.5	0.0	1.100	467.4	0.0			

Results for 2 year Critical Storm Duration. Lowest mass balance: 99.80%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S41	10	94.933	0.046	4.9	0.0659	0.0000	OK
15 minute summer	S42	11	94.404	0.049	7.6	0.0704	0.0000	OK
15 minute summer	S43	11	94.001	0.059	12.1	0.0847	0.0000	OK
15 minute summer	S44	11	93.221	0.077	23.0	0.1099	0.0000	OK
15 minute summer	S45	11	91.038	0.075	26.6	0.1074	0.0000	OK
15 minute summer	S46	11	89.717	0.081	32.1	0.1156	0.0000	OK
15 minute summer	S47	11	87.005	0.102	36.0	0.1455	0.0000	OK
15 minute summer	S48	11	86.557	0.071	36.0	0.0804	0.0000	OK
15 minute summer	S49	10	85.691	0.391	35.9	0.4425	0.0000	SURCHARGED
120 minute summer	S50	88	85.353	0.103	20.1	20.0972	0.0000	OK
180 minute summer	S51	116	85.378	0.508	14.3	0.7263	0.0000	SURCHARGED
30 minute summer	S52	72	84.613	0.038	4.9	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 summer	S41	1.000	S42	4.8	1.063	0.197	0.1103	
15 minute summer	S42	1.001	S43	7.5	1.028	0.106	0.1627	
15 minute summer	S43	1.002	S44	12.0	1.193	0.153	0.3540	
15 minute summer	S44	1.003	S45	23.0	1.955	0.246	0.7989	
15 minute summer	S45	1.004	S46	26.7	2.192	0.235	0.3427	
15 minute summer	S46	1.005	S47	32.0	2.536	0.267	0.6394	
15 minute summer	S47	1.006	S48	36.0	2.146	0.205	0.2834	
15 minute summer	S48	1.007	S49	35.9	2.382	0.125	0.6677	
15 minute summer	S49	1.008	S50	51.9	1.606	1.276	1.3210	
120 minute summer	S50	1.009	S51	13.7	0.697	0.081	0.6549	
180 minute summer	S51	1.010	S52	4.9	0.930	0.035	0.0973	46.4

Results for 30 year +45% CC +10% A Critical Storm Duration. Lowest mass balance: 99.51%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S41	10	94.973	0.086	14.6	0.1234	0.0000	OK
15 minute summer	S42	10	94.443	0.088	22.7	0.1265	0.0000	OK
15 minute summer	S43	10	94.048	0.106	36.2	0.1515	0.0000	OK
15 minute summer	S44	10	93.290	0.146	69.0	0.2086	0.0000	OK
15 minute summer	S45	11	91.108	0.145	79.5	0.2069	0.0000	OK
15 minute summer	S46	11	89.795	0.159	96.2	0.2281	0.0000	OK
15 minute summer	S47	11	87.100	0.197	108.4	0.2817	0.0000	OK
15 minute summer	S48	11	86.625	0.139	108.5	0.1567	0.0000	OK
15 minute summer	S49	11	85.986	0.686	108.3	0.7754	0.0000	SURCHARGED
240 minute winter	S50	228	85.663	0.413	26.6	95.5792	0.0000	SURCHARGED
240 minute winter	S51	228	85.662	0.792	9.7	1.1337	0.0000	SURCHARGED
30 minute winter	S52	15	84.613	0.038	4.9	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 summer	S41	1.000	S42	14.3	1.404	0.588	0.2495	
15 minute summer	S42	1.001	S43	22.6	1.377	0.317	0.3628	
15 minute summer	S43	1.002	S44	35.9	1.572	0.455	0.7957	
15 minute summer	S44	1.003	S45	68.5	2.531	0.733	1.8389	
15 minute summer	S45	1.004	S46	80.0	2.804	0.705	0.8018	
15 minute summer	S46	1.005	S47	96.4	3.291	0.805	1.4840	
15 minute summer	S47	1.006	S48	108.5	2.688	0.618	0.6783	
15 minute summer	S48	1.007	S49	108.3	2.032	0.376	0.8347	
15 minute summer	S49	1.008	S50	109.9	2.082	2.703	1.9777	
240 minute winter	S50	1.009	S51	9.7	0.651	0.057	1.0043	
240 minute winter	S51	1.010	S52	4.9	0.930	0.035	0.0973	114.3

Results for 100 year +50% CC +10% A Critical Storm Duration. Lowest mass balance: 99.07%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S41	10	94.992	0.105	19.3	0.1502	0.0000	OK
15 minute summer	S42	10	94.459	0.104	30.1	0.1495	0.0000	OK
30 minute summer	S43	18	94.067	0.125	47.8	0.1795	0.0000	OK
30 minute summer	S44	18	93.329	0.185	91.0	0.2645	0.0000	OK
15 minute summer	S45	11	91.146	0.183	105.3	0.2618	0.0000	OK
15 minute summer	S46	12	89.965	0.329	127.6	0.4704	0.0000	SURCHARGED
30 minute summer	S47	18	87.141	0.238	140.1	0.3401	0.0000	OK
15 minute summer	S48	11	86.703	0.217	140.2	0.2454	0.0000	OK
15 minute summer	S49	11	86.292	0.992	139.4	1.1218	0.0000	FLOOD RISK
240 minute winter	S50	236	85.826	0.576	36.0	145.0293	0.0000	SURCHARGED
240 minute winter	S51	236	85.825	0.955	8.0	1.3672	0.0000	FLOOD RISK
60 minute summer	S52	20	84.613	0.038	4.9	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 summer	S41	1.000	S42	18.9	1.486	0.777	0.3118	
15 minute summer	S42	1.001	S43	29.9	1.469	0.420	0.4505	
30 minute summer	S43	1.002	S44	47.7	1.635	0.606	1.0074	
30 minute summer	S44	1.003	S45	90.7	2.621	0.969	2.3545	
15 minute summer	S45	1.004	S46	106.2	2.887	0.936	1.0399	
15 minute summer	S46	1.005	S47	123.7	3.273	1.034	2.0051	
30 minute summer	S47	1.006	S48	139.9	2.739	0.797	0.9123	
15 minute summer	S48	1.007	S49	139.4	2.070	0.484	1.0208	
15 minute summer	S49	1.008	S50	136.6	2.468	3.359	2.2793	
240 minute winter	S50	1.009	S51	8.0	0.650	0.047	1.0043	
240 minute winter	S51	1.010	S52	4.9	0.930	0.035	0.0973	121.9