

JS Bloor (Wilmslow) Ltd		Page 1
Dean Court 85 Adlington Road Wilmslow SK9 1BT		
Date 15/01/2024 08:54 File PH4 NET 4 12.01.MDX	Designed by d_southa Checked by	
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Network Design Table for Surface Network 4

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.004	38.768	0.078	497.0	0.185	0.00	0.0	0.600	o	600	Pipe/Conduit	
4.000	26.077	1.030	25.3	0.135	5.00	0.0	0.600	o	300	Pipe/Conduit	
4.001	32.208	0.740	43.5	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.005	20.022	0.040	500.5	0.093	0.00	0.0	0.600	o	600	Pipe/Conduit	
5.000	56.434	0.554	101.9	0.104	5.00	0.0	0.600	o	375	Pipe/Conduit	
1.006	49.499	0.741	66.8	0.189	0.00	0.0	0.600	o	600	Pipe/Conduit	
1.007	21.990	0.044	499.8	0.114	0.00	0.0	0.600	o	675	Pipe/Conduit	
1.008	23.168	0.080	289.6	0.287	0.00	0.0	0.600	ooo	46	Pipe/Conduit	
1.009	87.576	0.210	417.0	0.086	0.00	0.0	0.600	o	675	Pipe/Conduit	
1.010	19.277	0.040	481.9	0.024	0.00	0.0	0.600	o	675	Pipe/Conduit	
1.011	41.556	0.083	500.7	0.064	0.00	0.0	0.600	o	675	Pipe/Conduit	
1.012	18.054	0.097	186.1	0.000	0.00	0.0	0.600	o	675	Pipe/Conduit	
1.013	30.881	0.000	0.0	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
6.000	37.185	0.490	75.9	0.237	5.00	0.0	0.600	o	375	Pipe/Conduit	
6.001	17.625	0.181	97.6	0.124	0.00	0.0	0.600	o	450	Pipe/Conduit	
6.002	42.117	0.109	385.0	0.017	0.00	0.0	0.600	o	450	Pipe/Conduit	
6.003	18.109	0.351	51.5	0.080	0.00	0.0	0.600	o	450	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.004	50.00	6.40	96.008	0.787	0.0	0.0	0.0	1.09	306.9	106.5
4.000	50.00	5.14	98.000	0.135	0.0	0.0	0.0	3.14	221.8	18.3
4.001	50.00	5.36	96.970	0.135	0.0	0.0	0.0	2.39	168.9	18.3
1.005	50.00	6.71	95.930	1.015	0.0	0.0	0.0	1.08	305.8	137.4
5.000	50.00	5.52	96.637	0.104	0.0	0.0	0.0	1.80	198.3	14.1
1.006	50.00	6.99	95.890	1.308	0.0	0.0	0.0	2.98	843.3	177.1
1.007	50.00	7.30	95.074	1.422	0.0	0.0	0.0	1.17	417.1	192.5
1.008	50.00	7.67	95.030	1.708	0.0	0.0	0.0	1.06	350.5	231.3
1.009	50.00	8.81	94.950	1.794	0.0	0.0	0.0	1.28	457.0	243.0
1.010	50.00	9.08	94.740	1.818	0.0	0.0	0.0	1.19	424.8	246.2
1.011	50.00	9.68	94.700	1.882	0.0	0.0	0.0	1.16	416.7	254.8
1.012	49.67	9.83	94.617	1.882	0.0	0.0	0.0	1.92	686.3	254.8
1.013	44.48	12.02	94.595	1.882	0.0	0.0	0.0	0.23	66.4«	254.8
6.000	50.00	5.30	96.725	0.237	0.0	0.0	0.0	2.08	229.9	32.1
6.001	50.00	5.44	96.160	0.361	0.0	0.0	0.0	2.06	327.3	48.9
6.002	50.00	6.12	95.979	0.378	0.0	0.0	0.0	1.03	163.8	51.2
6.003	50.00	6.23	95.870	0.458	0.0	0.0	0.0	2.84	451.2	62.0

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Simulation Criteria for Surface Network 4

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	0.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

Number of Input Hydrographs	0	Number of Storage Structures	1
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	2	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	19.400	Storm Duration (mins)	30
Ratio R	0.410		

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Online Controls for Surface Network 4

Hydro-Brake® Optimum Manhole: S4023 - Control Chamber, DS/PN: 1.015, Volume (m³): 12.1

Unit Reference	MD-SHE-0118-7100-1400-7100
Design Head (m)	1.400
Design Flow (l/s)	7.1
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	118
Invert Level (m)	94.500
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.400	7.1	Kick-Flo®	0.864	5.7
Flush-Flo™	0.410	7.1	Mean Flow over Head Range	-	6.2

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	4.2	1.200	6.6	3.000	10.2	7.000	15.2
0.200	6.5	1.400	7.1	3.500	10.9	7.500	15.7
0.300	7.0	1.600	7.6	4.000	11.6	8.000	16.2
0.400	7.1	1.800	8.0	4.500	12.3	8.500	16.7
0.500	7.0	2.000	8.4	5.000	12.9	9.000	17.1
0.600	6.9	2.200	8.8	5.500	13.5	9.500	17.6
0.800	6.2	2.400	9.1	6.000	14.1		
1.000	6.1	2.600	9.5	6.500	14.7		

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Storage Structures for Surface Network 4

Tank or Pond Manhole: S4023 - Control Chamber, DS/PN: 1.015

Invert Level (m) 94.500

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	1123.6	0.500	1473.6	1.000	1851.2	1.500	2254.9
0.100	1190.4	0.600	1547.0	1.100	1929.8	1.600	2338.8
0.200	1259.7	0.700	1621.5	1.200	2009.5	1.700	2423.7
0.300	1329.9	0.800	1697.0	1.300	2090.3	1.701	2423.7
0.400	1401.3	0.900	1773.6	1.400	2172.0		

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Micro Drainage

Summary of Critical Results by Maximum Level (Rank 1) for Surface Network

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Simulation Criteria

Areal Reduction Factor 1.000

Additional Flow - % of Total Flow 0.000

Hot Start (mins) 0

MADD Factor * 10m³/ha Storage 0.000

Hot Start Level (mm) 0

Inlet Coeffiecient 0.800

Manhole Headloss Coeff (Global) 0.500

Flow per Person per Day (1/per/day) 0.000

Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0

Number of Storage Structures 1

Number of Online Controls 1

Number of Time/Area Diagrams 0

Number of Offline Controls 0

Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model

FSR

Ratio R 0.410

Region England and Wales Cv (Summer) 0.750

M5-60 (mm)

19.400 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 300.0

DVD Status OFF

Analysis Timestep

Fine Inertia Status OFF

DTS Status

ON

Profile(s)

Summer and Winter

Duration(s) (mins)

15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440

Return Period(s) (years)

1, 30, 100

Climate Change (%)

0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	S1002	15 Winter	100	+40%					100.083
1.001	S1003	15 Winter	100	+40%					99.548
1.002	S1004	15 Winter	100	+40%	100/15 Summer				99.488
2.000	S1005	15 Winter	100	+40%	100/15 Summer				99.524
1.003	S1006	15 Winter	100	+40%	100/15 Summer				99.370
3.000	S1007	15 Winter	100	+40%	100/15 Summer				98.267
3.001	S1008	15 Winter	100	+40%	100/15 Summer				98.226
1.004	S1009	15 Winter	100	+40%	30/15 Winter				98.187
4.000	S1010	15 Winter	100	+40%					98.277
4.001	S1011	15 Winter	100	+40%	100/15 Summer				98.173
1.005	S1012	15 Winter	100	+40%	30/15 Winter				98.054
5.000	S1013	15 Winter	100	+40%	100/15 Summer				97.909
1.006	S1014	15 Winter	100	+40%	100/15 Summer				97.865
1.007	S1015	15 Winter	100	+40%	30/15 Summer	100/15 Winter			97.453
1.008	S1016	15 Winter	100	+40%	30/15 Summer				97.382
1.009	S1017	15 Winter	100	+40%	30/15 Summer				97.147
1.010	S1019	15 Winter	100	+40%	30/15 Summer				96.798
1.011	S1020	15 Winter	100	+40%	30/15 Summer				96.575
1.012	S1021	15 Winter	100	+40%	30/15 Summer				96.321

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Summary of Critical Results by Maximum Level (Rank 1) for Surface Network

PN	US/MH	Surcharged	Flooded	Flow / Cap.	Overflow (l/s)	Pipe	Status	Level
	Name	Depth (m)	Volume (m³)			Flow (l/s)		Exceeded
1.000	S1002	-0.112	0.000	0.49		33.1	OK	
1.001	S1003	-0.042	0.000	0.49		85.4	OK	
1.002	S1004	0.408	0.000	0.72		103.1	SURCHARGED	
2.000	S1005	0.465	0.000	0.73		88.9	SURCHARGED	
1.003	S1006	0.725	0.000	0.92		222.2	SURCHARGED	
3.000	S1007	1.297	0.000	0.39		92.9	FLOOD RISK	
3.001	S1008	1.516	0.000	0.51		82.2	SURCHARGED	
1.004	S1009	1.579	0.000	1.45		377.6	SURCHARGED	
4.000	S1010	-0.023	0.000	0.41		82.2	OK	
4.001	S1011	0.903	0.000	0.47		73.3	SURCHARGED	
1.005	S1012	1.524	0.000	2.24		462.0	FLOOD RISK	
5.000	S1013	0.897	0.000	0.30		54.7	FLOOD RISK	
1.006	S1014	1.375	0.000	0.80		589.9	FLOOD RISK	
1.007	S1015	1.704	18.699	2.11		614.0	FLOOD	3
1.008	S1016	1.977	0.000	2.23		670.0	SURCHARGED	
1.009	S1017	1.522	0.000	1.47		615.1	SURCHARGED	
1.010	S1019	1.383	0.000	2.25		616.8	SURCHARGED	
1.011	S1020	1.200	0.000	1.76		614.4	SURCHARGED	
1.012	S1021	1.029	0.000	1.32		614.2	SURCHARGED	

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<u>Summary of Critical Results by Maximum Level (Rank 1) for Surface Network</u>								
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PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood		
1.013	S1022	15 Winter	100	+40%	30/15 Summer			
6.000	S8143	15 Winter	100	+40%	100/15 Summer			
6.001	S8130	15 Winter	100	+40%	100/15 Summer			
6.002	S8158	15 Winter	100	+40%	100/15 Summer			
6.003	S8129	15 Winter	100	+40%	100/15 Summer			
7.000	S4004	15 Winter	100	+40%	30/15 Winter	100/15 Summer		
6.004	S4005	15 Winter	100	+40%	30/15 Winter			
6.005	S8122	15 Winter	100	+40%	30/15 Summer	100/15 Summer		
8.000	S8166	15 Winter	100	+40%	30/15 Summer			
6.006	S8123	15 Winter	100	+40%	30/15 Summer			
6.007	S8125	15 Winter	100	+40%	30/15 Summer			
6.008	S4020	15 Winter	100	+40%	30/15 Summer			
6.009	S4021 - Headwall	15 Winter	100	+40%	30/15 Summer	30/600 Summer		
1.014	S4022	1440 Winter	100	+40%	30/15 Summer			
1.015	S4023 - Control Chamber	1440 Winter	100	+40%	1/180 Winter			
PN	US/MH Name	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)
1.013	S1022			96.093	0.898	0.000	4.35	
6.000	S8143			98.041	0.941	0.000	0.62	
6.001	S8130			97.836	1.226	0.000	0.80	
6.002	S8158			97.710	1.281	0.000	1.32	
6.003	S8129			97.494	1.174	0.000	0.68	
7.000	S4004			97.329	1.261	6.998	0.90	
6.004	S4005			97.323	1.354	0.000	1.00	
6.005	S8122			96.948	1.354	14.619	2.12	
8.000	S8166			96.786	1.233	0.000	0.56	
6.006	S8123			96.760	1.250	0.000	1.91	
6.007	S8125			96.316	0.952	0.000	1.61	
6.008	S4020			95.981	0.781	0.000	1.23	
6.009	S4021 - Headwall			95.844	0.724	0.000	3.60	
1.014	S4022			95.843	0.648	0.000	0.28	
1.015	S4023 - Control Chamber			95.843	1.043	0.000	0.12	
PN	US/MH Name	Pipe Flow (l/s)	Status	Level Exceeded				
1.013	S1022	603.9	FLOOD RISK					
6.000	S8143	128.5	SURCHARGED					
6.001	S8130	190.5	FLOOD RISK					
6.002	S8158	193.0	FLOOD RISK					
6.003	S8129	227.2	FLOOD RISK					
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Summary of Critical Results by Maximum Level (Rank 1) for Surface Network
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PN	US/MH Name	Pipe Flow (l/s)	Status	Level Exceeded
7.000		S4004 89.8	FLOOD	3
6.004		S4005 314.8	FLOOD RISK	
6.005		S8122 301.2	FLOOD	4
8.000		S8166 48.5	FLOOD RISK	
6.006		S8123 365.7	FLOOD RISK	
6.007		S8125 402.0	SURCHARGED	
6.008		S4020 427.4	SURCHARGED	
6.009	S4021 - Headwall	420.7	FLOOD RISK	
1.014		S4022 75.1	SURCHARGED	
1.015	S4023 - Control Chamber	7.1	FLOOD RISK	