

Banners Gate Ltd		Page 0
Cavendish House 10-11 Birmingham Street Halesowen W Midlands B63 3HN	Littlehampton	
Date 20/08/2019 File STORM NETWORK 2 19.08.2...	Designed by TB Checked by	
XP Solutions Network 2018.1.1		

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for NETWORK 2 19.08.20.SWS

Pipe Sizes NETWORK 2 19.08.17 Manhole Sizes NETWORK 2 19.08.17

FEH Rainfall Model	
Return Period (years)	2
FEH Rainfall Version	2013
Site Location	GB 503220 103890
Data Type	Point
Maximum Rainfall (mm/hr)	50
Maximum Time of Concentration (mins)	30
Foul Sewage (l/s/ha)	0.000
Volumetric Runoff Coeff.	0.750
PIMP (%)	100
Add Flow / Climate Change (%)	0
Minimum Backdrop Height (m)	0.200
Maximum Backdrop Height (m)	0.000
Mn Design Depth for Optimisation (m)	1.200
Mn Vel for Auto Design only (m/s)	0.75
Mn Slope for Optimisation (1:X)	500

Designed with Level Soffits

Time Area Diagram for NETWORK 2 19.08.20.SWS

Time	Area	Time	Area
(mins)	(ha)	(mins)	(ha)
0-4	0.141	4-8	0.038

Total Area Contributing (ha) = 0.179

Total Pipe Volume (mE) = 12.858

Network Design Table for NETWORK 2 19.08.20.SWS

Y - Indicates pipe capacity < flow

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
S1.000	3.473	0.021	167.0	0.000	6.00	0.0	0.600	o	225	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	√ I.Area (ha)	√ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.000	50.00	6.06	4.884	0.000	0.0	0.0	0.0	1.01	40.1	0.0

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Area Summary for NETWORK 2 19.08.20.SW5

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	-	-	100	0.000	0.000	0.000
1.001	-	-	100	0.000	0.000	0.000
2.000	-	-	100	0.032	0.032	0.032
1.002	-	-	100	0.147	0.147	0.147
1.003	-	-	100	0.000	0.000	0.000
1.004	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				0.179	0.179	0.179

Free Flowing Outfall Details for NETWORK 2 19.08.20.SW5

Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Mn I. Level (m)	D, L (mm)	W (mm)
S1.004	S22	7.120	4.623	0.000	1200	0

Simulation Criteria for NETWORK 2 19.08.20.SW5

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10mE/ha Storage	2.000
Hot Start (mins)	0	Inlet Coefficient	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
Number of Online Controls		1	Number of Time/Area Diagrams
Number of Offline Controls		0	Number of Real Time Controls

Synthetic Rainfall Details

Rainfall Model	FEH	Summer Storms	Yes
Return Period (years)	2	Winter Storms	Yes
FEH Rainfall Version	2013	Cv (Summer)	0.750
Site Location	GB 503220 103890	Cv (Winter)	0.840
Data Type	Point Storm Duration (mins)		30

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Online Controls for NETWORK 2 19.08.20.SWS

Hydro-Brake÷ Optimum Manhole: SHB2, DS/PN: S1.003, Volume (mE): 15.8

Unit Reference	MD-SHE-0097-5000-1575-5000
Design Head (m)	1.575
Design Flow (l/s)	5.0
Flush-Flow	Calculated
Objective	Minimise upstream storage
Application	Surface
Surp Available	Yes
Diameter (mm)	97
Invert Level (m)	4.765
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.575	5.0
Flush-Flow	0.424	4.7
Kick-Flow	0.863	3.8
Mean Flow over Head Range	-	4.2

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	3.1	1.200	4.4	3.000	6.7	7.000	10.1
0.200	4.3	1.400	4.7	3.500	7.3	7.500	10.4
0.300	4.6	1.600	5.0	4.000	7.7	8.000	10.7
0.400	4.7	1.800	5.3	4.500	8.2	8.500	11.0
0.500	4.7	2.000	5.6	5.000	8.6	9.000	11.4
0.600	4.6	2.200	5.8	5.500	9.0	9.500	11.7
0.800	4.1	2.400	6.1	6.000	9.4		
1.000	4.0	2.600	6.3	6.500	9.7		

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<u>Summary of Critical Results by Maximum Level (Rank 1) for NETWORK 2</u> <u>19.08.20.SW5</u>																																																																																									
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