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Gloucester House 66a Church Walk Burgess Hill, BN43 6LB	11117 Wandleys Farm Storm Network Surcharged Outfall	
Date 07/05/2021 15:27 File 11117_SW Network.mdx	Designed by phurst Checked by JP	
XP Solutions	Network 2020.1	

STORM SEWER DESIGN by the Modified Rational Method

Network Design Table for Surface Network 2

« - 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
1.000	16.927	0.250	67.7	0.013	5.00	0.0	0.600	o	100	Pipe/Conduit	
1.001	18.036	0.250	72.1	0.061	0.00	0.0	0.600	o	100	Pipe/Conduit	
1.002	26.289	0.350	75.1	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
1.003	24.914	0.230	108.3	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
1.004	5.507	0.120	45.9	0.114	0.00	0.0	0.600	o	150	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)
1.000	50.00	5.30	21.550	0.013	0.0	0.0	0.0	0.94	7.4	1.8
1.001	50.00	5.63	21.300	0.074	0.0	0.0	0.0	0.91	7.1«	10.0
1.002	50.00	6.13	21.050	0.074	0.0	0.0	0.0	0.89	7.0«	10.0
1.003	50.00	6.56	20.650	0.074	0.0	0.0	0.0	0.96	17.1	10.0
1.004	50.00	6.62	20.420	0.188	0.0	0.0	0.0	1.49	26.3	25.5

Surcharged Outfall Details for Surface Network 2

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
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1.004	S4	21.030	20.300	0.000	0	0
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Surcharged Outfall Details for Surface Network 2

Datum (m) 20.200 Offset (mins) 0

Time (mins)	Depth (m)	Time (mins)	Depth (m)
1440	0.700	2880	0.700

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Online Controls for Surface Network 2

Hydro-Brake® Optimum Manhole: S6, DS/PN: 1.001, Volume (m³): 0.7

Unit Reference	MD-SHE-0049-1000-0800-1000	Sump Available	Yes
Design Head (m)	0.800	Diameter (mm)	49
Design Flow (l/s)	1.0	Invert Level (m)	21.300
Flush-Flo™	Calculated	Minimum Outlet Pipe Diameter (mm)	75
Objective	Minimise upstream storage	Suggested Manhole Diameter (mm)	1200
Application	Surface		

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.800	1.0	Kick-Flo®	0.437	0.8
Flush-Flo™	0.215	0.9	Mean Flow over Head Range	-	0.8

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)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	0.8	0.600	0.9	1.600	1.4	2.600	1.7	5.000	2.3	7.500	2.8
0.200	0.9	0.800	1.0	1.800	1.4	3.000	1.8	5.500	2.4	8.000	2.9
0.300	0.9	1.000	1.1	2.000	1.5	3.500	1.9	6.000	2.5	8.500	2.9
0.400	0.8	1.200	1.2	2.200	1.6	4.000	2.1	6.500	2.6	9.000	3.0
0.500	0.8	1.400	1.3	2.400	1.6	4.500	2.2	7.000	2.7	9.500	3.1

Hydro-Brake® Optimum Manhole: S3, DS/PN: 1.004, Volume (m³): 1.3

Unit Reference	MD-SHE-0050-1000-0750-1000	Application	Surface
Design Head (m)	0.750	Sump Available	Yes
Design Flow (l/s)	1.0	Diameter (mm)	50
Flush-Flo™	Calculated	Invert Level (m)	20.420
Objective	Minimise upstream storage	Minimum Outlet Pipe Diameter (mm)	75

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Hydro-Brake® Optimum Manhole: S3, DS/PN: 1.004, Volume (m³): 1.3

Suggested Manhole Diameter (mm) 1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.750	1.0	Kick-Flo®	0.445	0.8
Flush-Flo™	0.222	1.0	Mean Flow over Head Range	-	0.9

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)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	0.9	0.600	0.9	1.600	1.4	2.600	1.7	5.000	2.4	7.500	2.9
0.200	1.0	0.800	1.0	1.800	1.5	3.000	1.9	5.500	2.5	8.000	2.9
0.300	0.9	1.000	1.1	2.000	1.6	3.500	2.0	6.000	2.6	8.500	3.0
0.400	0.9	1.200	1.2	2.200	1.6	4.000	2.1	6.500	2.7	9.000	3.1
0.500	0.8	1.400	1.3	2.400	1.7	4.500	2.3	7.000	2.8	9.500	3.2

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Storage Structures for Surface Network 2

Porous Car Park Manhole: S6, DS/PN: 1.001

Infiltration Coefficient Base (m/hr)	0.00000	Porosity	0.30	Slope (1:X)	0.0
Membrane Percolation (mm/hr)	1000	Invert Level (m)	21.500	Depression Storage (mm)	5
Max Percolation (l/s)	78.6	Width (m)	10.0	Evaporation (mm/day)	3
Safety Factor	2.0	Length (m)	28.3	Membrane Depth (mm)	0

Porous Car Park Manhole: S3, DS/PN: 1.004

Infiltration Coefficient Base (m/hr)	0.00000	Porosity	0.30	Slope (1:X)	0.0
Membrane Percolation (mm/hr)	1000	Invert Level (m)	20.500	Depression Storage (mm)	5
Max Percolation (l/s)	129.7	Width (m)	10.0	Evaporation (mm/day)	3
Safety Factor	2.0	Length (m)	46.7	Membrane Depth (mm)	0

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Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 2

Simulation Criteria

Areal Reduction Factor 1.000 Manhole Headloss Coeff (Global) 0.500 MADD Factor * 10m³/ha Storage 2.000
 Hot Start (mins) 0 Foul Sewage per hectare (l/s) 0.000 Inlet Coefficient 0.800
 Hot Start Level (mm) 0 Additional Flow - % of Total Flow 0.000 Flow per Person per Day (l/per/day) 0.000

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
 Number of Online Controls 2 Number of Storage Structures 2 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH Data Type Point
 FEH Rainfall Version 2013 Cv (Summer) 0.750
 Site Location GB 495398 106588 SU 95398 06588 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 300.0 DTS Status OFF Inertia Status ON
 Analysis Timestep Medium DVD Status ON

Profile(s) Summer and Winter
 Duration(s) (mins) 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880
 Return Period(s) (years) 2, 30, 100
 Climate Change (%) 0, 0, 40

PN	US/MH		Event	US/CL (m)	Water	Surcharged	Flooded	Flow / Cap.	Overflow (l/s)	Maximum Vol (m³)	Pipe	Status
	Name				Level (m)	Depth (m)	Volume (m³)				Flow	
1.000	S5	240 minute	100 year	Winter I+40%	22.500	21.955	0.305	0.000	0.22	0.243	1.5	SURCHARGED
1.001	S6	240 minute	100 year	Winter I+40%	22.200	21.953	0.553	0.000	0.13	38.960	0.9	FLOOD RISK
1.002	S7	2880 minute	100 year	Winter I+40%	21.700	21.380	0.230	0.000	0.14	0.328	0.9	SURCHARGED
1.003	S8	2880 minute	100 year	Winter I+40%	21.650	21.372	0.572	0.000	0.06	0.635	0.9	FLOOD RISK
1.004	S3	2880 minute	100 year	Winter I+40%	21.400	21.368	0.798	0.000	0.05	122.886	1.0	FLOOD RISK