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St Andrew's House 23 Kingfield Road Sheffield S11 9AS		
Date 01/01/0001 File SW 27.03.24.MDX	Designed by GHolley Checked by	
Innovyze	Network 2019.1	

STORM SEWER DESIGN by the Modified Rational Method

Network Design Table for SW 27.03.24.SWS

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	46.079	0.461	100.0	0.060	5.00	0.0	0.600	o	150	Pipe/Conduit	
1.001	17.119	0.171	100.1	0.015	0.00	0.0	0.600	o	150	Pipe/Conduit	
2.000	11.149	0.111	100.4	0.065	5.00	0.0	0.600	o	150	Pipe/Conduit	
1.002	21.256	0.208	102.2	0.019	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.003	64.330	0.587	109.6	0.152	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.004	23.213	1.161	20.0	0.097	0.00	0.0	0.600	o	300	Pipe/Conduit	
3.000	4.382	0.020	219.1	0.000	5.00	0.0	0.600	o	300	Pipe/Conduit	
1.005	7.701	0.055	140.0	0.000	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	48.70	5.76	185.916	0.060	0.0	0.0	0.0	1.01	17.8	7.9
1.001	47.75	6.05	185.455	0.075	0.0	0.0	0.0	1.00	17.7	9.7
2.000	50.78	5.19	185.395	0.065	0.0	0.0	0.0	1.00	17.7	8.9
1.002	46.88	6.32	185.209	0.159	0.0	0.0	0.0	1.29	51.4	20.2
1.003	44.38	7.18	185.001	0.311	0.0	0.0	0.0	1.25	49.6	37.4
1.004	44.08	7.29	184.339	0.408	0.0	0.0	0.0	3.53	249.6	48.7
3.000	51.22	5.07	182.695	0.000	0.0	0.0	0.0	1.06	74.8	0.0
1.005	50.91	5.15	182.625	0.000	3.5	0.0	0.0	0.85	15.0	3.5

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Manhole Schedules for SW 27.03.24.SWS

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
1	187.266	1.350	Open Manhole	1200	1.000	185.916	150				
2	187.651	2.196	Open Manhole	1200	1.001	185.455	150	1.000	185.455	150	
3	187.088	1.693	Open Manhole	1200	2.000	185.395	150				
4	187.334	2.125	Open Manhole	1200	1.002	185.209	225	1.001	185.284	150	
								2.000	185.284	150	
5	187.862	2.861	Open Manhole	1200	1.003	185.001	225	1.002	185.001	225	
6	187.175	2.836	Open Manhole	1200	1.004	184.339	300	1.003	184.414	225	
7	184.025	1.330	Open Manhole	1200	3.000	182.695	300				
8	185.241	2.616	Open Manhole	2400	1.005	182.625	150	1.004	183.178	300	703
								3.000	182.675	300	200
10	184.656	2.086	Open Manhole	0		OUTFALL		1.005	182.570	150	

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
1	420476.985	428497.941	420476.985	428497.941	Required	
2	420435.685	428477.504	420435.685	428477.504	Required	
3	420431.967	428451.086	420431.967	428451.086	Required	
4	420428.875	428461.798	420428.875	428461.798	Required	
5	420408.488	428455.782	420408.488	428455.782	Required	
6	420344.182	428457.548	420344.182	428457.548	Required	
7	420339.516	428432.364	420339.516	428432.364	Required	
8	420343.424	428434.347	420343.424	428434.347	Required	
10	420344.862	428426.782			No Entry	

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Free Flowing Outfall Details for SW 27.03.24.SWS

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.005	10	184.656	182.570	0.000	0	0

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Online Controls for SW 27.03.24.SWS

Hydro-Brake® Optimum Manhole: 8, DS/PN: 1.005, Volume (m³): 13.5

Unit Reference	MD-SHE-0083-3500-1400-3500
Design Head (m)	1.400
Design Flow (l/s)	3.5
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	83
Invert Level (m)	182.625
Minimum Outlet Pipe Diameter (mm)	100
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.400	3.5
Flush-Flo™	0.363	3.2
Kick-Flo®	0.739	2.6
Mean Flow over Head Range	-	2.9

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)
0.100	2.5	1.200	3.3	3.000	5.0	7.000	7.4
0.200	3.1	1.400	3.5	3.500	5.4	7.500	7.7
0.300	3.2	1.600	3.7	4.000	5.7	8.000	7.9
0.400	3.2	1.800	3.9	4.500	6.0	8.500	8.1
0.500	3.2	2.000	4.1	5.000	6.3	9.000	8.4
0.600	3.1	2.200	4.3	5.500	6.6	9.500	8.6
0.800	2.7	2.400	4.5	6.000	6.9		
1.000	3.0	2.600	4.7	6.500	7.2		

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<u>Storage Structures for SW 27.03.24.SWS</u> <u>Tank or Pond Manhole: 7, DS/PN: 3.000</u> Invert Level (m) 182.695 <table><tr><th>Depth (m)</th><th>Area (m²)</th><th>Depth (m)</th><th>Area (m²)</th><th>Depth (m)</th><th>Area (m²)</th></tr><tr><td>0.000</td><td>231.0</td><td>1.200</td><td>231.0</td><td>1.201</td><td>0.0</td></tr></table>			Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	0.000	231.0	1.200	231.0	1.201	0.0
Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)									
0.000	231.0	1.200	231.0	1.201	0.0									
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