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Firth Buildings 99-101 Leeds Road Dewsbury WF12 7BU	Yorkshire Country Properties Denby Dale Prelim SWS1 Rev A	
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Micro Drainage	Network 2020.1	

STORM SEWER DESIGN by the Modified Rational Method

Pipe Sizes STANDARD Manhole Sizes STANDARD

Return Period (years)	2	PIMP (%)	100
M5-60 (mm)	19.000	Add Flow / Climate Change (%)	0
Ratio R	0.340	Minimum Backdrop Height (m)	0.000
Maximum Rainfall (mm/hr)	75	Maximum Backdrop Height (m)	0.000
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Network Design Table for Storm

Network Results Table

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PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.000	o	225	S1	181.500	180.000	1.275	Open Manhole	1200
S1.001	o	225	S2	180.550	179.300	1.025	Open Manhole	1200
S1.002	o	225	S3	178.650	176.800	1.625	Open Manhole	1200
S2.000	o	225	S4	178.850	177.400	1.225	Open Manhole	1200
S2.001	o	225	S5	177.850	176.300	1.325	Open Manhole	1200
S2.002	o	225	S6	178.050	176.050	1.775	Open Manhole	1200
S1.003	o	300	S8	177.000	173.000	3.700	Open Manhole	1500
S1.004	o	300	S9	176.100	171.700	4.100	Open Manhole	1500
S1.005	o	225	S10	175.500	170.450	4.825	Open Manhole	2100

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.000	10.000	14.3	S2	180.550	179.300	1.025	Open Manhole	1200
S1.001	45.740	18.3	S3	178.650	176.800	1.625	Open Manhole	1200
S1.002	17.650	9.8	S8	177.000	175.000	1.775	Open Manhole	1500
S2.000	13.000	11.8	S5	177.850	176.300	1.325	Open Manhole	1200
S2.001	20.250	81.0	S6	178.050	176.050	1.775	Open Manhole	1200
S2.002	30.400	31.2	S8	177.000	175.075	1.700	Open Manhole	1500
S1.003	13.000	10.0	S9	176.100	171.700	4.100	Open Manhole	1500
S1.004	12.000	10.0	S10	175.500	170.500	4.700	Open Manhole	2100
S1.005	31.750	19.2	S	170.000	168.800	0.975	Open Manhole	0

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Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	-	-	100	0.030	0.030	0.030
1.001	-	-	100	0.082	0.082	0.082
1.002	-	-	100	0.057	0.057	0.057
2.000	-	-	100	0.051	0.051	0.051
2.001	-	-	100	0.105	0.105	0.105
2.002	-	-	100	0.000	0.000	0.000
1.003	-	-	100	0.163	0.163	0.163
1.004	-	-	100	0.000	0.000	0.000
1.005	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				0.488	0.488	0.488

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Online Controls for Storm

Hydro-Brake® Optimum Manhole: S10, DS/PN: S1.005, Volume (m³): 18.2

Unit Reference	MD-SHE-0084-5000-2800-5000
Design Head (m)	2.800
Design Flow (l/s)	5.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	84
Invert Level (m)	170.450
Minimum Outlet Pipe Diameter (mm)	100
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	2.800	5.0	Kick-Flo®	0.756	2.7
Flush-Flo™	0.371	3.4	Mean Flow over Head Range	-	3.7

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	3.4	3.000	5.2	7.000	7.7
0.200	3.2	1.400	3.6	3.500	5.5	7.500	8.0
0.300	3.4	1.600	3.9	4.000	5.9	8.000	8.2
0.400	3.4	1.800	4.1	4.500	6.2	8.500	8.4
0.500	3.3	2.000	4.3	5.000	6.6	9.000	8.7
0.600	3.2	2.200	4.5	5.500	6.9	9.500	8.9
0.800	2.8	2.400	4.7	6.000	7.2		
1.000	3.1	2.600	4.8	6.500	7.4		

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