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Sanderson House Jubilee Way Huddersfield, WF4 4TD	70 Vernon Road Barnsley SWS v1	
Date 08/07/2019 12:09 File SWS v1.mdx	Designed by LM Checked by	
Micro Drainage		Network 2018.1.1

Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdrop (mm)
1	85.350	0.550	Open Manhole	450	1.000	84.800	150				
2	85.350	0.800	Open Manhole	450	1.001	84.550	150	1.000	84.550	150	
3	85.500	0.700	Open Manhole	450	2.000	84.800	150				
4	85.500	1.143	Open Manhole	450	1.002	84.357	150	1.001	84.357	150	
								2.000	84.357	150	
5	85.650	1.392	Open Manhole	450	1.003	84.258	150	1.002	84.258	150	
6	85.650	1.553	Open Manhole	450	1.004	84.097	150	1.003	84.097	150	
7	85.650	1.950	Open Manhole	450	1.005	83.700	150	1.004	83.700	150	
8	85.650	0.500	Open Manhole	450	3.000	85.150	150				
9	85.650	2.157	Open Manhole	450	1.006	83.493	150	1.005	83.493	150	
								3.000	84.500	150	1007
10	85.650	2.256	Open Manhole	1200	1.007	83.394	225	1.006	83.394	150	
13	85.100	1.883	Open Manhole	1800	1.008	83.217	150	1.007	83.267	225	125
	84.500	1.533	Open Manhole	0		OUTFALL		1.008	82.967	150	

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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., (mm)	L*W
1.000	o	150	1	85.350	84.800	0.400	Open Manhole		450
1.001	o	150	2	85.350	84.550	0.650	Open Manhole		450
2.000	o	150	3	85.500	84.800	0.550	Open Manhole		450
1.002	o	150	4	85.500	84.357	0.993	Open Manhole		450
1.003	o	150	5	85.650	84.258	1.242	Open Manhole		450
1.004	o	150	6	85.650	84.097	1.403	Open Manhole		450
1.005	o	150	7	85.650	83.700	1.800	Open Manhole		450
3.000	o	150	8	85.650	85.150	0.350	Open Manhole		450
1.006	o	150	9	85.650	83.493	2.007	Open Manhole		450
1.007	o	225	10	85.650	83.394	2.031	Open Manhole		1200
1.008	o	150	13	85.100	83.217	1.733	Open Manhole		1800

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., (mm)	L*W
1.000	10.000	40.0	2	85.350	84.550	0.650	Open Manhole		450
1.001	15.400	79.8	4	85.500	84.357	0.993	Open Manhole		450
2.000	13.550	30.6	4	85.500	84.357	0.993	Open Manhole		450
1.002	7.900	79.8	5	85.650	84.258	1.242	Open Manhole		450
1.003	12.900	80.1	6	85.650	84.097	1.403	Open Manhole		450
1.004	6.300	15.9	7	85.650	83.700	1.800	Open Manhole		450
1.005	16.550	80.0	9	85.650	83.493	2.007	Open Manhole		450
3.000	16.900	26.0	9	85.650	84.500	1.000	Open Manhole		450
1.006	7.900	79.8	10	85.650	83.394	2.106	Open Manhole		1200
1.007	19.000	149.6	13	85.100	83.267	1.608	Open Manhole		1800
1.008	18.900	75.6		84.500	82.967	1.383	Open Manhole		0

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D, L (mm)	W (mm)
1.008		84.500	82.967	0.000	0	0

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Online Controls for Storm

Hydro-Brake® Optimum Manhole: 13, DS/PN: 1.008, Volume (m³): 5.5

Unit Reference	MD-SHE-0100-5000-1400-5000
Design Head (m)	1.400
Design Flow (l/s)	5.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	100
Invert Level (m)	83.217
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.400	5.0
Flush-Flo™	0.416	5.0
Kick-Flo®	0.855	4.0
Mean Flow over Head Range	-	4.4

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

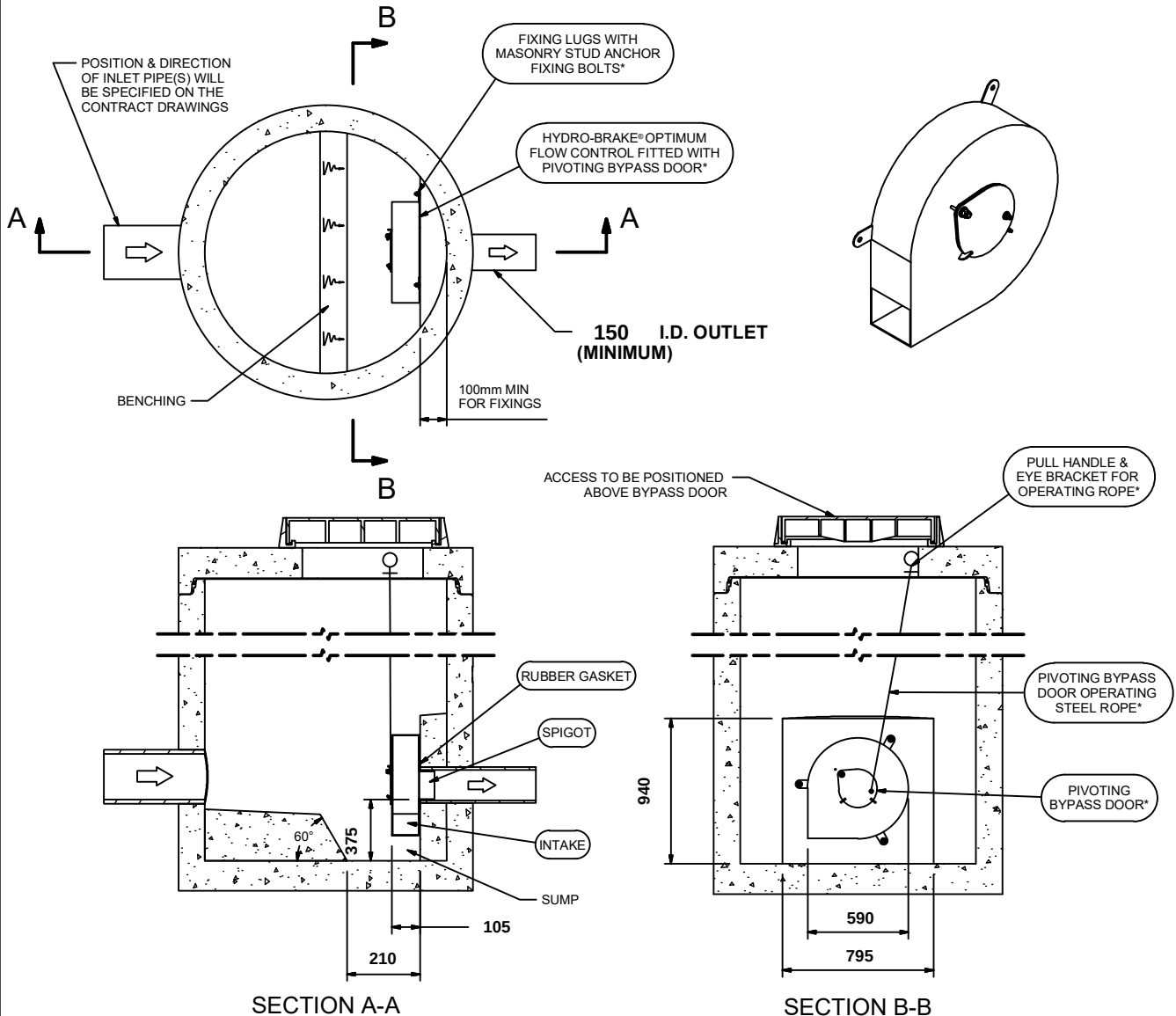
Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	3.3	1.200	4.7	3.000	7.1	7.000	10.7
0.200	4.6	1.400	5.0	3.500	7.7	7.500	11.0
0.300	4.9	1.600	5.3	4.000	8.2	8.000	11.4
0.400	5.0	1.800	5.6	4.500	8.6	8.500	11.7
0.500	5.0	2.000	5.9	5.000	9.1	9.000	12.0
0.600	4.9	2.200	6.2	5.500	9.5	9.500	12.3
0.800	4.3	2.400	6.4	6.000	9.9		
1.000	4.3	2.600	6.7	6.500	10.3		

Technical Specification

Control Point	Head (m)	Flow (l/s)
Primary Design	1.400	5.000
Flush-Flo™	0.416	4.991
Kick-Flo®	0.855	3.980
Mean Flow		4.382

Hydro-Brake® Optimum Flow Control including:

- 3 mm grade 304L stainless steel
- Integral stainless steel pivoting by-pass door allowing clear line of sight through to outlet, c/w stainless steel operating rope
- Beed blasted finish to maximise corrosion resistance
- Stainless steel fixings
- Rubber gasket to seal outlet



IMPORTANT:

○ LIMIT OF HYDRO INTERNATIONAL SUPPLY

THE DEVICE WILL BE HANDED TO SUIT SITE CONDITIONS
FOR SITE SPECIFIC DETAILS AND MINIMUM CHAMBER SIZE REFER TO HYDRO INTERNATIONAL
ALL CIVIL AND INSTALLATION WORK BY OTHERS

* WHERE SUPPLIED

HYDRO-BRAKE® FLOW CONTROL & HYDRO-BRAKE® OPTIMUM FLOW CONTROL ARE REGISTERED TRADEMARKS FOR FLOW CONTROLS DESIGNED AND MANUFACTURED EXCLUSIVELY BY HYDRO INTERNATIONAL

THIS DESIGN LAYOUT IS FOR ILLUSTRATIVE PURPOSES ONLY. NOT TO SCALE.

**DESIGN
ADVICE**



The head/flow characteristics of this SHE-0100-5000-1400-5000 Hydro-Brake® Optimum Flow Control are unique. Dynamic hydraulic modelling evaluates the full head/flow characteristic curve.
The use of any other flow control will invalidate any design based on this data and could constitute a flood risk.

**Hydro
International**

DATE 7/8/2019 8:53 AM

SITE Vernon Road, Worsbrough

DESIGNER Lee Mozley

REF 11030

SHE-0100-5000-1400-5000

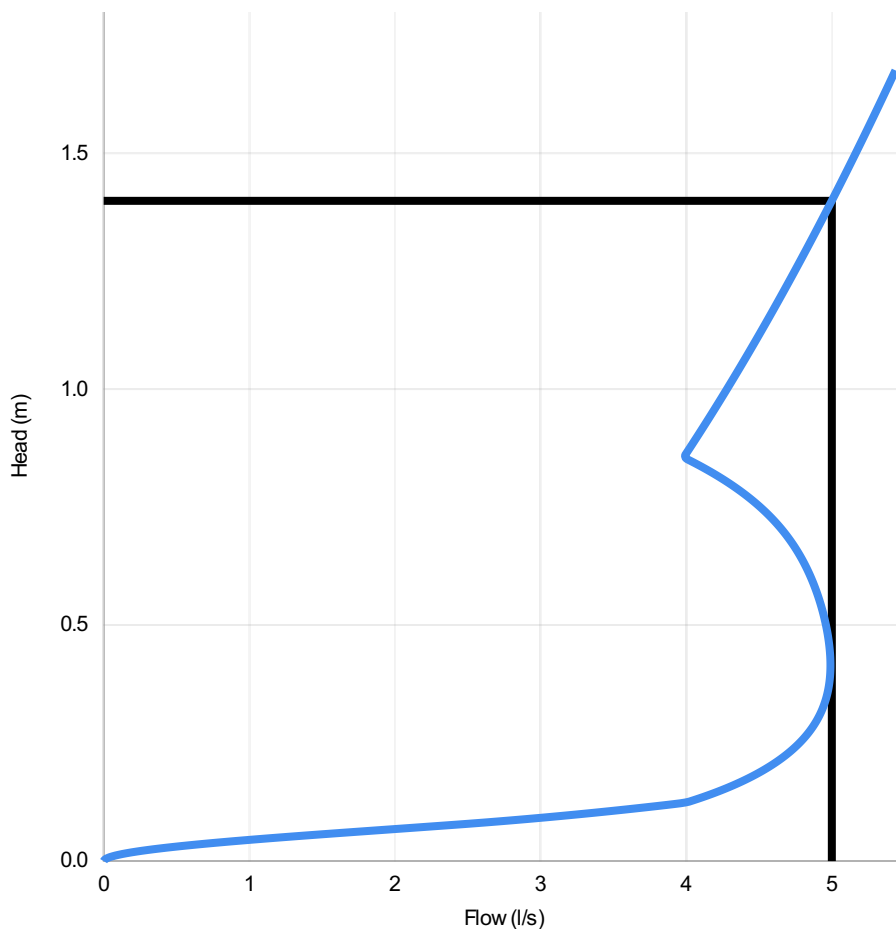
Hydro-Brake® Optimum

Technical Specification

Control Point	Head (m)	Flow (l/s)
Primary Design	1.400	5.000
Flush-Flo	0.416	4.991
Kick-Flo®	0.855	3.980
Mean Flow		4.382



PT/329/0412



Head (m)	Flow (l/s)
0.000	0.000
0.048	1.130
0.097	3.168
0.145	4.196
0.193	4.532
0.241	4.747
0.290	4.880
0.338	4.954
0.386	4.986
0.434	4.989
0.483	4.971
0.531	4.936
0.579	4.885
0.628	4.817
0.676	4.723
0.724	4.597
0.772	4.424
0.821	4.194
0.869	4.010
0.917	4.111
0.966	4.209
1.014	4.305
1.062	4.399
1.110	4.490
1.159	4.579
1.207	4.667
1.255	4.752
1.303	4.836
1.352	4.918
1.400	4.999

DESIGN ADVICE



The head/flow characteristics of this SHE-0100-5000-1400-5000 Hydro-Brake Optimum® Flow Control are unique. Dynamic hydraulic modelling evaluates the full head/flow characteristic curve.

The use of any other flow control will invalidate any design based on this data and could constitute a flood risk.

Hydro
International

DATE	08/07/2019 08:53
Site	Vernon Road, Worsbrough
DESIGNER	Lee Mozley
Ref	11030

SHE-0100-5000-1400-5000
Hydro-Brake Optimum®

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Micro Drainage		Network 2018.1.1																		
Storage Structures for Storm Cellular Storage Manhole: 13, DS/PN: 1.008 Invert Level (m) 83.307 Safety Factor 2.0 Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95 Infiltration Coefficient Side (m/hr) 0.00000 <table><thead><tr><th>Depth (m)</th><th>Area (m²)</th><th>Inf. Area (m²)</th><th>Depth (m)</th><th>Area (m²)</th><th>Inf. Area (m²)</th></tr></thead><tbody><tr><td>0.000</td><td>35.0</td><td>0.0</td><td>0.801</td><td>0.0</td><td>0.0</td></tr><tr><td>0.800</td><td>35.0</td><td>0.0</td><td></td><td></td><td></td></tr></tbody></table>			Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	0.000	35.0	0.0	0.801	0.0	0.0	0.800	35.0	0.0			
Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)															
0.000	35.0	0.0	0.801	0.0	0.0															
0.800	35.0	0.0																		
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Sanderson Associates

Sanderson House

Jubilee Way

Huddersfield, WF4 4TD

Date 08/07/2019 12:10

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Micro Drainage

70 Vernon Road

Barnsley

SWS v1

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Network 2018.1.1

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

Simulation Criteria

Areal Reduction Factor 1.000

Additional Flow - % of Total Flow 0.000

Hot Start (mins) 0

MADD Factor * 10m³/ha Storage 2.000

Hot Start Level (mm) 0

Inlet Coefficient 0.800

Manhole Headloss Coeff (Global) 0.500

Flow per Person per Day (l/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 0.359

Return Period (years)

100 Cv (Summer)

0.750

Region England and Wales

Cv (Winter)

0.840

M5-60 (mm)

19.000

Margin for Flood Risk Warning (mm)

300.0

Analysis Timestep 2.5 Second Increment (Extended)

DTS Status

OFF

DVD Status

ON

Inertia Status

ON

Profile(s)

Winter

Duration(s) (mins)

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

Sensitivity flows(s) (%)

0, +30

PN	US/MH Name	Storm	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	1 15	Winter	+30%	+30%/15	Winter			85.255
1.001	2 15	Winter	+30%	+30%/15	Winter			85.251
2.000	3 15	Winter	+30%	+30%/15	Winter			85.252
1.002	4 15	Winter	+30%	+0%/15	Winter			85.236
1.003	5 15	Winter	+30%	+0%/15	Winter			85.213
1.004	6 15	Winter	+30%	+0%/15	Winter			85.158
1.005	7 15	Winter	+30%	+0%/15	Winter			85.107
3.000	8 15	Winter	+30%					85.184
1.006	9 15	Winter	+30%	+0%/15	Winter			84.549
1.007	10 60	Winter	+30%	+0%/15	Winter			84.306
1.008	13 60	Winter	+30%	+0%/15	Winter			84.297

PN	US/MH Name	Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	1	0.305	0.000	0.08		2.0	FLOOD RISK	
1.001	2	0.551	0.000	0.32		5.9	FLOOD RISK	

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

PN	US/MH Name	Surcharged Flooded		Pipe		Status	Level Exceeded
		Depth (m)	Volume (m ³)	Flow / Overflow Cap. (l/s)	Flow (l/s)		
2.000	3	0.302	0.000	0.17	5.1	FLOOD RISK	
1.002	4	0.729	0.000	0.68	11.7	FLOOD RISK	
1.003	5	0.805	0.000	0.77	14.0	SURCHARGED	
1.004	6	0.911	0.000	0.43	16.2	SURCHARGED	
1.005	7	1.257	0.000	1.61	29.8	SURCHARGED	
3.000	8	-0.116	0.000	0.11	3.7	OK	
1.006	9	0.906	0.000	2.78	48.0	SURCHARGED	
1.007	10	0.687	0.000	0.76	29.2	SURCHARGED	
1.008	13	0.930	0.000	0.26	5.0	SURCHARGED	