

Technical Specification

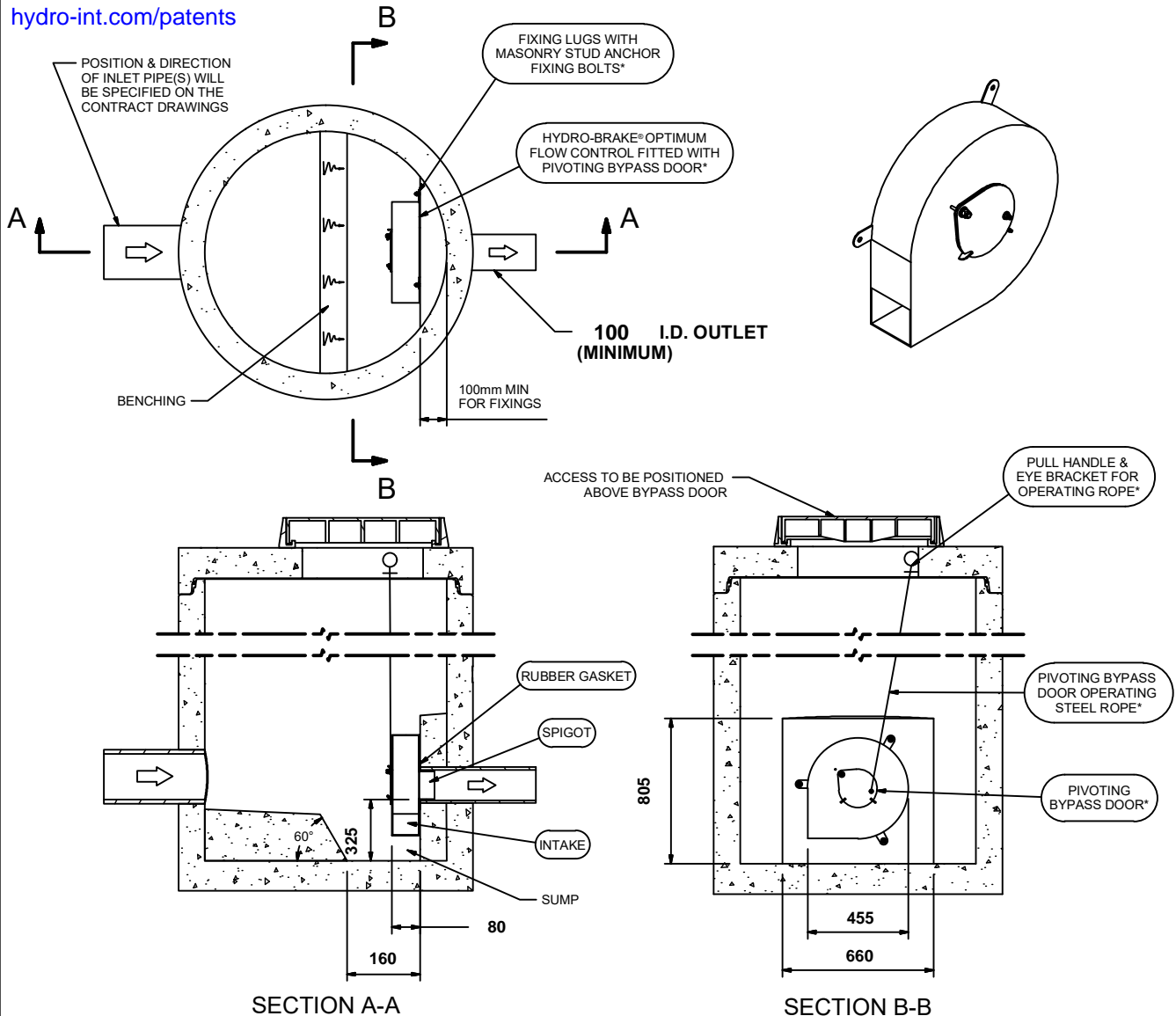
Control Point	Head (m)	Flow (l/s)
Primary Design	1.900	3.300
Flush-Flo™	0.329	2.536
Kick-Flo®	0.669	2.046
Mean Flow		2.540

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
- Indicative Weight: 97 kg



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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-0075-3300-1900-3300 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 5/19/2022 4:53 PM

SITE 19-5-22

DESIGNER richard bland

REF sandygate lane

SHE-0075-3300-1900-3300

Hydro-Brake® Optimum

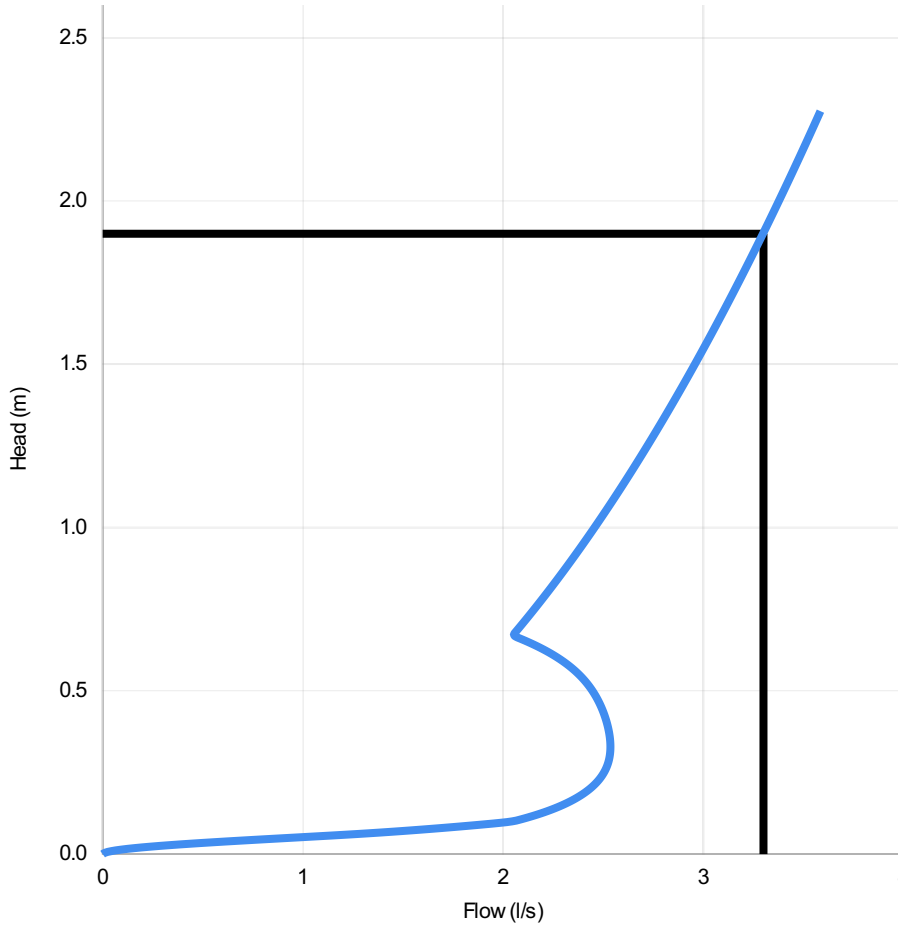
Technical Specification

Control Point	Head (m)	Flow (l/s)
Primary Design	1.900	3.300
Flush-Flo	0.329	2.536
Kick-Flo®	0.669	2.046
Mean Flow		2.540



PT/329/0412

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Head (m)	Flow (l/s)
0.000	0.000
0.066	1.373
0.131	2.218
0.197	2.426
0.262	2.514
0.328	2.536
0.393	2.522
0.459	2.484
0.524	2.417
0.590	2.301
0.655	2.104
0.721	2.117
0.786	2.202
0.852	2.283
0.917	2.361
0.983	2.437
1.048	2.509
1.114	2.580
1.179	2.648
1.245	2.714
1.310	2.779
1.376	2.842
1.441	2.903
1.507	2.963
1.572	3.022
1.638	3.079
1.703	3.135
1.769	3.190
1.834	3.244
1.900	3.297

DESIGN ADVICE

The head/flow characteristics of this SHE-0075-3300-1900-3300 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.



DATE	19/05/2022 16:53
Site	19-5-22
DESIGNER	richard bland
Ref	sandygate lane

SHE-0075-3300-1900-3300
Hydro-Brake Optimum®

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STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD







FSR Rainfall Model - England and Wales

Return Period (years)	2	PIMP (%)	100
M5-60 (mm)	19.000	Add Flow / Climate Change (%)	30
Ratio R	0.352	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	1.500
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

Designed with Level Soffits

Network Design Table for Storm

« - 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	27.500	1.050	26.2	0.085	4.00	0.0	0.600	o	150	Pipe/Conduit	
1.001	26.800	1.500	17.9	0.042	0.00	0.0	0.600	o	150	Pipe/Conduit	
1.002	10.500	1.050	10.0	0.021	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.003	33.000	0.120	275.0	0.042	0.00	0.0	0.600	o	1800	Pipe/Conduit	
1.004	6.030	0.060	100.5	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
1.005	14.310	0.143	100.1	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)	E I.Area (ha)	E Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	50.00	4.23	52.100	0.085	0.0	0.0	3.5	1.98	34.9	15.0
1.001	50.00	4.42	51.050	0.127	0.0	0.0	5.2	2.39	42.3	22.4
1.002	50.00	4.46	49.475	0.148	0.0	0.0	6.0	4.16	165.5	26.1
1.003	50.00	4.65	45.570	0.190	0.0	0.0	7.7	2.89	7344.5	33.4
1.004	50.00	4.75	45.400	0.190	0.0	0.0	7.7	1.00	17.7«	33.4
1.005	50.00	4.99	45.340	0.190	0.0	0.0	7.7	1.00	17.8«	33.4

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)
1.005		47.100	45.197	0.000	0	0

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Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Additional Flow - % of Total Flow	30.000
Areal Reduction Factor	1.000	MADD Factor * 10m ³ /ha Storage	0.000
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	0
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	Profile Type	Winter
Return Period (years)	1	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	19.000	Storm Duration (mins)	15
Ratio R	0.352		

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Online Controls for Storm


Hydro-Brake® Optimum Manhole: 2, DS/PN: 1.004, Volume (m³): 89.6

Unit Reference	MD-SHE-0075-3300-1900-3300
Design Head (m)	1.900
Design Flow (l/s)	3.3
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	75
Invert Level (m)	45.400
Minimum Outlet Pipe Diameter (mm)	100
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.900	3.3
Flush-Flo™	0.329	2.5
Kick-Flo®	0.669	2.0
Mean Flow over Head Range	-	2.5

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	2.0	1.200	2.7	3.000	4.1	7.000	6.1
0.200	2.4	1.400	2.9	3.500	4.4	7.500	6.3
0.300	2.5	1.600	3.0	4.000	4.7	8.000	6.5
0.400	2.5	1.800	3.2	4.500	4.9	8.500	6.7
0.500	2.4	2.000	3.4	5.000	5.2	9.000	6.8
0.600	2.3	2.200	3.5	5.500	5.4	9.500	7.0
0.800	2.2	2.400	3.7	6.000	5.6		
1.000	2.5	2.600	3.8	6.500	5.9		

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Summary of Results for 15 minute 1 year Winter (Storm)

Margin for Flood Risk Warning (mm) 200.0
 Analysis Timestep 2.5 Second Increment (Extended)
 DTS Status ON
 DVD Status OFF
 Inertia Status OFF


PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Overflow Cap. (l/s)	Pipe Flow (l/s)	Status
1.000	A	52.170	-0.080	0.000	0.45	15.0	OK
1.001	B	51.127	-0.073	0.000	0.52	20.9	OK
1.002	C	49.537	-0.163	0.000	0.17	23.8	OK
1.003	1	45.943	-1.427	0.000	0.01	27.4	OK
1.004	2	45.943	0.393	0.000	0.17	2.5	SURCHARGED
1.005	3	45.379	-0.111	0.000	0.16	2.5	OK

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Summary of Results for 30 minute 1 year Winter (Storm)

Margin for Flood Risk Warning (mm) 200.0
 Analysis Timestep 2.5 Second Increment (Extended)
 DTS Status ON
 DVD Status OFF
 Inertia Status OFF


PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap. (l/s)	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	A	52.160	-0.090	0.000	0.34		11.4	OK
1.001	B	51.116	-0.084	0.000	0.40		16.3	OK
1.002	C	49.530	-0.170	0.000	0.14		18.9	OK
1.003	1	46.005	-1.365	0.000	0.01		22.5	OK
1.004	2	46.005	0.455	0.000	0.17		2.5	SURCHARGED
1.005	3	45.379	-0.111	0.000	0.16		2.5	OK

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Summary of Results for 60 minute 1 year Winter (Storm)

Margin for Flood Risk Warning (mm) 200.0
 Analysis Timestep 2.5 Second Increment (Extended)
 DTS Status ON
 DVD Status OFF
 Inertia Status OFF


PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Overflow Cap. (l/s)	Pipe	Status
						Flow (l/s)	
1.000	A	52.149	-0.101	0.000	0.23	7.7	OK
1.001	B	51.104	-0.096	0.000	0.28	11.3	OK
1.002	C	49.521	-0.179	0.000	0.09	13.0	OK
1.003	1	46.046	-1.324	0.000	0.00	15.8	OK
1.004	2	46.046	0.496	0.000	0.17	2.5	SURCHARGED
1.005	3	45.379	-0.111	0.000	0.16	2.5	OK

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Summary of Results for 120 minute 1 year Winter (Storm)

Margin for Flood Risk Warning (mm) 200.0
 Analysis Timestep 2.5 Second Increment (Extended)
 DTS Status ON
 DVD Status OFF
 Inertia Status OFF


PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Overflow Cap. (l/s)	Pipe	Status
						Flow (l/s)	
1.000	A	52.138	-0.112	0.000	0.15	4.9	OK
1.001	B	51.093	-0.107	0.000	0.18	7.3	OK
1.002	C	49.511	-0.189	0.000	0.06	8.5	OK
1.003	1	46.049	-1.321	0.000	0.00	10.4	OK
1.004	2	46.049	0.499	0.000	0.17	2.5	SURCHARGED
1.005	3	45.379	-0.111	0.000	0.16	2.5	OK

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Summary of Results for 180 minute 1 year Winter (Storm)

Margin for Flood Risk Warning (mm) 200.0
 Analysis Timestep 2.5 Second Increment (Extended)
 DTS Status ON
 DVD Status OFF
 Inertia Status OFF


PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap. (l/s)	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	A	52.134	-0.116	0.000	0.11		3.8	OK
1.001	B	51.087	-0.113	0.000	0.14		5.7	OK
1.002	C	49.506	-0.194	0.000	0.05		6.6	OK
1.003	1	46.035	-1.335	0.000	0.00		8.1	OK
1.004	2	46.035	0.485	0.000	0.17		2.5	SURCHARGED
1.005	3	45.379	-0.111	0.000	0.16		2.5	OK

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Summary of Results for 15 minute 30 year Winter (Storm)

Margin for Flood Risk Warning (mm) 200.0
 Analysis Timestep 2.5 Second Increment (Extended)
 DTS Status ON
 DVD Status OFF
 Inertia Status OFF


PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Overflow Cap. (l/s)	Pipe Flow (l/s)	Status
1.000	A	52.995	0.745	0.000	0.99	33.1	FLOOD RISK
1.001	B	51.909	0.709	0.000	1.21	49.0	FLOOD RISK
1.002	C	49.576	-0.124	0.000	0.41	56.8	OK
1.003	1	46.330	-1.040	0.000	0.02	69.6	OK
1.004	2	46.330	0.780	0.000	0.17	2.5	SURCHARGED
1.005	3	45.379	-0.111	0.000	0.15	2.5	OK

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Summary of Results for 30 minute 30 year Winter (Storm)

Margin for Flood Risk Warning (mm) 200.0
 Analysis Timestep 2.5 Second Increment (Extended)
 DTS Status ON
 DVD Status OFF
 Inertia Status OFF


PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap. (l/s)	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	A	52.206	-0.044	0.000	0.84		28.0	OK
1.001	B	51.265	0.065	0.000	1.02		41.3	SURCHARGED
1.002	C	49.566	-0.134	0.000	0.35		48.0	OK
1.003	1	46.490	-0.880	0.000	0.01		58.8	OK
1.004	2	46.490	0.940	0.000	0.17		2.6	SURCHARGED
1.005	3	45.379	-0.111	0.000	0.16		2.6	OK

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Summary of Results for 60 minute 30 year Winter (Storm)

Margin for Flood Risk Warning (mm) 200.0
 Analysis Timestep 2.5 Second Increment (Extended)
 DTS Status ON
 DVD Status OFF
 Inertia Status OFF


PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap. (l/s)	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	A	52.180	-0.070	0.000	0.56		18.6	OK
1.001	B	51.142	-0.058	0.000	0.69		27.8	OK
1.002	C	49.548	-0.152	0.000	0.23		32.3	OK
1.003	1	46.633	-0.737	0.000	0.01		39.5	OK
1.004	2	46.633	1.083	0.000	0.18		2.7	SURCHARGED
1.005	3	45.381	-0.109	0.000	0.17		2.7	OK

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Summary of Results for 120 minute 30 year Winter (Storm)

Margin for Flood Risk Warning (mm) 200.0
 Analysis Timestep 2.5 Second Increment (Extended)
 DTS Status ON
 DVD Status OFF
 Inertia Status OFF


PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap. (l/s)	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	A	52.161	-0.089	0.000	0.35		11.6	OK
1.001	B	51.118	-0.082	0.000	0.43		17.3	OK
1.002	C	49.532	-0.168	0.000	0.15		20.1	OK
1.003	1	46.727	-0.643	0.000	0.01		24.8	OK
1.004	2	46.727	1.177	0.000	0.19		2.8	SURCHARGED
1.005	3	45.381	-0.109	0.000	0.17		2.8	OK

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Summary of Results for 180 minute 30 year Winter (Storm)

Margin for Flood Risk Warning (mm) 200.0
 Analysis Timestep 2.5 Second Increment (Extended)
 DTS Status ON
 DVD Status OFF
 Inertia Status OFF


PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Pipe		Status
					Flow / Cap. (l/s)	Overflow Flow (l/s)	
1.000	A	52.152	-0.098	0.000	0.26	8.8	OK
1.001	B	51.109	-0.091	0.000	0.32	13.1	OK
1.002	C	49.524	-0.176	0.000	0.11	15.2	OK
1.003	1	46.736	-0.634	0.000	0.00	18.8	OK
1.004	2	46.736	1.186	0.000	0.19	2.8	SURCHARGED
1.005	3	45.382	-0.108	0.000	0.17	2.8	OK

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Summary of Results for 240 minute 30 year Winter (Storm)

Margin for Flood Risk Warning (mm) 200.0
 Analysis Timestep 2.5 Second Increment (Extended)
 DTS Status ON
 DVD Status OFF
 Inertia Status OFF


PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap. (l/s)	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	A	52.147	-0.103	0.000	0.21		7.1	OK
1.001	B	51.102	-0.098	0.000	0.26		10.6	OK
1.002	C	49.520	-0.180	0.000	0.09		12.3	OK
1.003	1	46.713	-0.657	0.000	0.00		15.3	OK
1.004	2	46.713	1.163	0.000	0.19		2.8	SURCHARGED
1.005	3	45.381	-0.109	0.000	0.17		2.8	OK

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XP Solutions	Network 2019.1	

Summary of Results for 120 minute 100 year Winter (Storm)

Margin for Flood Risk Warning (mm) 200.0
 Analysis Timestep 2.5 Second Increment (Extended)
 DTS Status ON
 DVD Status OFF
 Inertia Status OFF


PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Pipe		Status
					Flow / Cap. (l/s)	Overflow Flow (l/s)	
1.000	A	52.171	-0.079	0.000	0.46	15.2	OK
1.001	B	51.131	-0.069	0.000	0.56	22.7	OK
1.002	C	49.541	-0.159	0.000	0.19	26.5	OK
1.003	1	47.137	-0.233	0.000	0.01	32.7	OK
1.004	2	47.137	1.587	0.000	0.21	3.2	SURCHARGED
1.005	3	45.385	-0.105	0.000	0.19	3.2	OK

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XP Solutions	Network 2019.1	

Summary of Results for 180 minute 100 year Winter (Storm)

Margin for Flood Risk Warning (mm) 200.0
 Analysis Timestep 2.5 Second Increment (Extended)
 DTS Status ON
 DVD Status OFF
 Inertia Status OFF


PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap. (l/s)	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	A	52.161	-0.089	0.000	0.34		11.5	OK
1.001	B	51.118	-0.082	0.000	0.42		17.2	OK
1.002	C	49.532	-0.168	0.000	0.14		20.0	OK
1.003	1	47.182	-0.188	0.000	0.01		24.7	OK
1.004	2	47.182	1.632	0.000	0.22		3.2	SURCHARGED
1.005	3	45.385	-0.105	0.000	0.20		3.2	OK

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XP Solutions	Network 2019.1	

Summary of Results for 240 minute 100 year Winter (Storm)

Margin for Flood Risk Warning (mm) 200.0
 Analysis Timestep 2.5 Second Increment (Extended)
 DTS Status ON
 DVD Status OFF
 Inertia Status OFF

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap. (l/s)	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	A	52.154	-0.096	0.000	0.28		9.3	OK
1.001	B	51.110	-0.090	0.000	0.34		13.8	OK
1.002	C	49.526	-0.174	0.000	0.12		16.1	OK
1.003	1	47.164	-0.206	0.000	0.00		19.9	OK
1.004	2	47.164	1.614	0.000	0.22		3.2	SURCHARGED
1.005	3	45.385	-0.105	0.000	0.20		3.2	OK

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12 Berry Holm Close Sheffield S35 1AB	Blackstone developments Sandygate Lane Max 3.3 l/s - MAY22	
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XP Solutions	Network 2019.1	

Summary of Results for 360 minute 100 year Winter (Storm)

Margin for Flood Risk Warning (mm) 200.0
 Analysis Timestep 2.5 Second Increment (Extended)
 DTS Status ON
 DVD Status OFF
 Inertia Status OFF

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap. (l/s)	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	A	52.146	-0.104	0.000	0.20		6.8	OK
1.001	B	51.101	-0.099	0.000	0.25		10.2	OK
1.002	C	49.519	-0.181	0.000	0.09		11.8	OK
1.003	1	47.090	-0.280	0.000	0.00		14.7	OK
1.004	2	47.090	1.540	0.000	0.21		3.1	SURCHARGED
1.005	3	45.384	-0.106	0.000	0.19		3.1	OK