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Whitefriars Bristol BS1 2NT	Stericycle Bradman Road Knowsley Existing SW Drainage Network	
Date 19/12/2022 13:46	Designed by WW	
File 21-305 Existing East SW ...	Checked by TP	
XP Solutions		Network 2020.1

STORM SEWER DESIGN by the Modified Rational Method

Network Design Table for SW

- Indicates pipe length does not match coordinates
« - 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	45.000	0.300	150.0	0.044	5.00	0.0	0.600	o	150	Pipe/Conduit	
1.001	33.890#	0.230	147.3	0.050	0.00	0.0	0.600	o	150	Pipe/Conduit	
2.000	16.119	0.700	23.0	0.047	5.00	0.0	0.600	o	225	Pipe/Conduit	
2.001	35.756	0.350	102.2	0.040	0.00	0.0	0.600	o	225	Pipe/Conduit	
3.000	12.719	0.100	127.2	0.093	5.00	0.0	0.600	o	150	Pipe/Conduit	
3.001	15.317#	0.150	102.1	0.094	0.00	0.0	0.600	o	150	Pipe/Conduit	
3.002	16.718	0.300	55.7	0.020	0.00	0.0	0.600	o	150	Pipe/Conduit	
2.002	29.065#	0.500	58.1	0.039	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.002	10.835	0.200	54.2	0.000	0.00	0.0	0.600	o	300	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	5.92	38.315	0.044	0.0	0.0	0.0	0.82	14.5	7.9
1.001	50.00	6.60	38.015	0.094	0.0	0.0	0.0	0.83	14.6«	17.0
2.000	50.00	5.10	39.350	0.047	0.0	0.0	0.0	2.74	108.9	8.5
2.001	50.00	5.56	38.650	0.087	0.0	0.0	0.0	1.29	51.4	15.7
3.000	50.00	5.24	38.950	0.093	0.0	0.0	0.0	0.89	15.7«	16.8
3.001	50.00	5.50	38.850	0.187	0.0	0.0	0.0	0.99	17.6«	33.8
3.002	50.00	5.70	38.600	0.207	0.0	0.0	0.0	1.35	23.9«	37.4
2.002	50.00	5.94	38.300	0.333	0.0	0.0	0.0	2.07	146.0	60.1
1.002	50.00	6.69	37.675	0.427	0.0	0.0	0.0	2.14	151.3	77.1

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Bristol
BS1 2NT

Stericycle Bradman Road
Knowsley
Existing SW Drainage Network

Date 19/12/2022 13:46
File 21-305 Existing East SW ...

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XP Solutions

Network 2020.1

Micro
Drainage

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for
SW

Simulation Criteria

Areal Reduction Factor 1.000
Hot Start (mins) 0
Hot Start Level (mm) 0
Manhole Headloss Coeff (Global) 0.500
Foul Sewage per hectare (l/s) 0.000

Additional Flow - % of Total Flow 0.000
MADD Factor * 10m³/ha Storage 2.000
Inlet Coefficient 0.800
Flow per Person per Day (l/per/day) 0.000

Number of Input Hydrographs 0
Number of Online Controls 0

Number of Offline Controls 0
Number of Storage Structures 0

Number of Time/Area Diagrams 0
Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR
Region England and Wales Cv (Summer) 0.730
M5-60 (mm) 19.700 Cv (Winter) 0.840

Ratio R 0.381

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) Summer and Winter

Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600

Return Period(s) (years) 1, 30, 100

Climate Change (%) 0, 0, 0

Water Surcharged Flooded

US/MH
PN Name Event

US/CL
(m)

Level
(m)

Depth
(m)

Volume
(m³)

Flow /
Cap.

Overflow
(l/s)

1.000 MH35 15 minute 1 year Winter I+0% 39.925 38.383 -0.082 0.000 0.40

1.001 MH36 15 minute 1 year Winter I+0% 40.090 38.117 -0.048 0.000 0.78

2.000 MH29 15 minute 1 year Winter I+0% 40.362 39.388 -0.187 0.000 0.07

2.001 MH35 15 minute 1 year Winter I+0% 40.080 38.722 -0.153 0.000 0.22

3.000 MH13 15 minute 1 year Winter I+0% 40.320 39.150 0.050 0.000 0.76

3.001 MH14 15 minute 1 year Winter I+0% 40.320 39.090 0.090 0.000 1.28

3.002 MH15 15 minute 1 year Winter I+0% 40.320 38.746 -0.004 0.000 1.00

2.002 MH09 15 minute 1 year Winter I+0% 40.080 38.408 -0.192 0.000 0.28

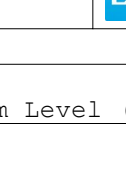
1.002 MH08 15 minute 1 year Winter I+0% 40.033 37.813 -0.162 0.000 0.43

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1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for
SW

	US/MH	Infil.	Maximum	Half Drain	Pipe	
PN	Name	Flow (l/s)	Velocity (m/s)	Time (mins)	Flow (l/s)	Status
1.000	MH35		0.8		5.7	OK
1.001	MH36		0.9		11.0	OK
2.000	MH29		1.5		6.3	OK
2.001	MH35		1.0		10.8	OK
3.000	MH13		0.9		10.9	SURCHARGED
3.001	MH14		1.2		20.7	SURCHARGED
3.002	MH15		1.4		22.2	OK
2.002	MH09		1.6		36.9	OK
1.002	MH08		1.5		47.9	OK

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SW

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 Coeffiecient	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 Offline Controls	0	Number of Time/Area Diagrams	0
Number of Online Controls	0	Number of Storage Structures	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.381
Region England and Wales Cv (Summer)			0.730
M5-60 (mm)	19.700 Cv (Winter)		0.840

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)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 0

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)
1.000	MH35	15 minute 30 year Winter I+0%	39.925	38.824	0.359	0.000	0.85	
1.001	MH36	15 minute 30 year Winter I+0%	40.090	38.618	0.453	0.000	1.69	
2.000	MH29	15 minute 30 year Winter I+0%	40.362	39.410	-0.165	0.000	0.16	
2.001	MH35	15 minute 30 year Winter I+0%	40.080	38.778	-0.097	0.000	0.60	
3.000	MH13	15 minute 30 year Winter I+0%	40.320	40.321	1.221	1.359	1.75	
3.001	MH14	15 minute 30 year Winter I+0%	40.320	40.275	1.275	0.000	2.25	
3.002	MH15	15 minute 30 year Winter I+0%	40.320	39.488	0.738	0.000	1.84	
2.002	MH09	15 minute 30 year Winter I+0%	40.080	38.470	-0.130	0.000	0.60	
1.002	MH08	15 minute 30 year Winter I+0%	40.033	37.900	-0.075	0.000	0.91	

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for SW

	US/MH	Infil.	Maximum	Half Drain	Pipe	
PN	Name	Flow (l/s)	Velocity (m/s)	Time (mins)	Flow (l/s)	Status
1.000	MH35		0.8		12.0	SURCHARGED
1.001	MH36		1.4		23.7	SURCHARGED
2.000	MH29		1.8		15.5	OK
2.001	MH35		1.3		29.0	OK
3.000	MH13		1.4		25.0	FLOOD
3.001	MH14		2.1		36.6	FLOOD RISK
3.002	MH15		2.3		40.9	SURCHARGED
2.002	MH09		2.0		79.6	OK
1.002	MH08		1.8		101.5	OK

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SW

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 Coeffiecient	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 Offline Controls	0	Number of Time/Area Diagrams	0
Number of Online Controls	0	Number of Storage Structures	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.381
Region England and Wales Cv (Summer)			0.730
M5-60 (mm)	19.700 Cv (Winter)		0.840

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)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 0

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Overflow Cap.
1.000	MH35	15 minute 100 year Winter I+0%	39.925	39.295	0.830	0.000	1.05
1.001	MH36	15 minute 100 year Winter I+0%	40.090	38.993	0.828	0.000	2.03
2.000	MH29	15 minute 100 year Winter I+0%	40.362	39.420	-0.155	0.000	0.21
2.001	MH35	15 minute 100 year Winter I+0%	40.080	38.803	-0.072	0.000	0.77
3.000	MH13	15 minute 100 year Winter I+0%	40.320	40.327	1.227	7.412	2.23
3.001	MH14	15 minute 100 year Winter I+0%	40.320	40.321	1.321	0.765	2.25
3.002	MH15	15 minute 100 year Winter I+0%	40.320	39.643	0.893	0.000	1.95
2.002	MH09	15 minute 100 year Winter I+0%	40.080	38.494	-0.106	0.000	0.73
1.002	MH08	15 minute 100 year Winter I+0%	40.033	38.007	0.032	0.000	1.09

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for SW

PN	US/MH Name	Infil. Flow (l/s)	Maximum Velocity (m/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
1.000	MH35		0.9		14.8	SURCHARGED
1.001	MH36		1.6		28.5	SURCHARGED
2.000	MH29		1.9		20.2	OK
2.001	MH35		1.3		37.5	OK
3.000	MH13		1.8		31.9	FLOOD
3.001	MH14		2.0		36.6	FLOOD
3.002	MH15		2.4		43.2	SURCHARGED
2.002	MH09		2.0		96.6	OK
1.002	MH08		1.8		122.3	SURCHARGED