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3rd Floor, Marlborough House 48 Holly Walk Leamington Spa CV32 4XP	C85850 Bartons Road, Havant Phase 1 Surface Water Calcs	
Date 22/06/2018 14:31 File 2018.06.19 PHASE 1 STRA...	Designed by CT Checked by KM	
Micro Drainage	Network 2018.1	

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for JNP SWS Pipe Network 1

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales			
Return Period (years)	1	PIMP (%)	100
M5-60 (mm)	19.500	Add Flow / Climate Change (%)	0
Ratio R	0.350	Minimum Backdrop Height (m)	0.000
Maximum Rainfall (mm/hr)	30	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)	300

Designed with Level Soffits

Network Design Table for JNP SWS Pipe Network 1

« - 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	12.479	0.930	13.4	0.167	5.00	0.0	0.600	o	225	Pipe/Conduit	
1.001	38.742	0.158	245.2	0.083	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.002	19.529	0.080	244.1	0.069	0.00	0.0	0.600	o	375	Pipe/Conduit	
1.003	30.000	0.060	500.0	0.000	0.00	0.0	0.600	[]	-2	Pipe/Conduit	
1.004	4.264	0.018	236.9	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	
1.005	4.065	0.016	254.1	0.116	0.00	0.0	0.600	o	375	Pipe/Conduit	
1.006	56.000	0.112	500.0	0.000	0.00	0.0	0.600	[]	-2	Pipe/Conduit	
1.007	2.437	0.010	243.7	0.000	0.00	0.0	0.600	o	525	Pipe/Conduit	
1.008	5.254	0.021	250.2	0.185	0.00	0.0	0.600	o	525	Pipe/Conduit	
1.009	54.000	0.108	500.0	0.000	0.00	0.0	0.600	[]	-2	Pipe/Conduit	
1.010	2.000	0.008	250.0	0.000	0.00	0.0	0.600	o	675	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	30.00	5.06	26.695	0.167	0.0	0.0	0.0	3.59	142.8	13.6
1.001	30.00	5.70	25.690	0.250	0.0	0.0	0.0	1.00	70.7	20.3
1.002	30.00	5.99	25.457	0.319	0.0	0.0	0.0	1.16	127.6	25.9
1.003	30.00	6.24	24.552	0.319	0.0	0.0	0.0	1.99	4871.5	25.9
1.004	30.00	6.30	24.492	0.319	0.0	0.0	0.0	1.17	129.5	25.9
1.005	30.00	6.36	24.474	0.435	0.0	0.0	0.0	1.13	125.0	35.3
1.006	30.00	6.83	24.458	0.435	0.0	0.0	0.0	1.99	4871.5	35.3
1.007	30.00	6.85	24.346	0.435	0.0	0.0	0.0	1.43	309.6	35.3
1.008	30.00	6.92	24.336	0.620	0.0	0.0	0.0	1.41	305.6	50.4
1.009	30.00	7.37	24.315	0.620	0.0	0.0	0.0	1.99	4871.5	50.4
1.010	30.00	7.39	24.207	0.620	0.0	0.0	0.0	1.65	591.5	50.4

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Network Design Table for JNP SWS Pipe Network 1

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
1.011	15.851	0.209	75.8	0.216	0.00	0.0	0.600	o	675	Pipe/Conduit		
2.000	107.160	6.210	17.3	0.114	5.00	0.0	0.600	o	150	Pipe/Conduit		
2.001	49.387	0.823	60.0	0.048	0.00	0.0	0.600	o	150	Pipe/Conduit		
2.002	15.020	0.367	40.9	0.062	0.00	0.0	0.600	o	150	Pipe/Conduit		
2.003	30.416	1.350	22.5	0.044	0.00	0.0	0.600	o	225	Pipe/Conduit		
3.000	5.000	0.033	151.5	0.000	5.00	0.0	0.600	o	300	Pipe/Conduit		
3.001	9.239	0.062	149.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit		
2.004	10.737	0.560	19.2	0.028	0.00	0.0	0.600	o	300	Pipe/Conduit		
4.000	5.000	0.033	151.5	0.000	5.00	0.0	0.600	o	300	Pipe/Conduit		
4.001	9.552	0.377	25.3	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit		
1.012	83.463	0.835	100.0	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)
1.011	30.00	7.48	24.199	0.836	0.0	0.0	0.0	3.01	1077.7	67.9
2.000	30.00	5.73	33.450	0.114	0.0	0.0	0.0	2.44	43.1	9.3
2.001	30.00	6.37	27.240	0.162	0.0	0.0	0.0	1.30	23.0	13.2
2.002	30.00	6.52	26.417	0.224	0.0	0.0	0.0	1.58	27.9	18.2
2.003	30.00	6.71	25.975	0.268	0.0	0.0	0.0	2.77	110.1	21.8
3.000	30.00	5.07	24.645	0.000	0.0	0.0	0.0	1.27	90.1	0.0
3.001	30.00	5.19	24.612	0.000	0.0	0.0	0.0	1.29	90.9	0.0
2.004	30.00	6.76	24.550	0.296	0.0	0.0	0.0	3.61	255.0	24.0
4.000	30.00	5.07	24.400	0.000	0.0	0.0	0.0	1.27	90.1	0.0
4.001	30.00	5.12	24.367	0.000	0.0	0.0	0.0	3.14	221.7	0.0
1.012	30.00	8.86	23.990	1.132	0.0	0.0	0.0	1.01	17.8«	92.0

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Conduit Sections for JNP SWS Pipe Network 1

NOTE: Diameters less than 66 refer to section numbers of hydraulic conduits. These conduits are marked by the symbols:- [] box culvert, \ / open channel, oo dual pipe, ooo triple pipe, O egg.

Section numbers < 0 are taken from user conduit table

Section Number	Conduit Type	Major Dimn. (mm)	Minor Dimn. (mm)	Side Slope (Deg)	Corner Splay (mm)	4*Hyd Radius (m)	XSect Area (m ²)
-2	[]	2400	1200	90.0	465	1.602	2.448

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Manhole Schedules for JNP SWS Pipe Network 1

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	28.505	1.810	Open Manhole	1200	1.000	26.695	225				
2	28.041	2.351	Open Manhole	1200	1.001	25.690	300	1.000	25.765	225	
3	28.417	2.960	Open Manhole	1500	1.002	25.457	375	1.001	25.532	300	
BC1a	28.661	4.109	Open Manhole	1200	1.003	24.552	-2	1.002	25.377	375	
BC1b	28.696	4.204	Open Manhole	1200	1.004	24.492	375	1.003	24.492	-2	
4	28.624	4.150	Open Manhole	1500	1.005	24.474	375	1.004	24.474	375	
BC2a	28.594	4.136	Open Manhole	1200	1.006	24.458	-2	1.005	24.458	375	
BC2b	27.877	3.531	Open Manhole	1200	1.007	24.346	525	1.006	24.346	-2	
5	27.847	3.511	Open Manhole	1500	1.008	24.336	525	1.007	24.336	525	
BC3a	27.781	3.466	Open Manhole	1200	1.009	24.315	-2	1.008	24.315	525	
BC3b	27.105	2.898	Open Manhole	1200	1.010	24.207	675	1.009	24.207	-2	
6	27.076	2.877	Open Manhole	1500	1.011	24.199	675	1.010	24.199	675	
9	34.952	1.502	Open Manhole	1200	2.000	33.450	150				
10	30.523	3.283	Open Manhole	1200	2.001	27.240	150	2.000	27.240	150	
11	28.469	2.052	Open Manhole	1200	2.002	26.417	150	2.001	26.417	150	
12	27.841	1.866	Open Manhole	1200	2.003	25.975	225	2.002	26.050	150	
14	26.385	1.740	Open Manhole	1200	3.000	24.645	300				
15	26.385	1.773	Open Manhole	1200	3.001	24.612	300	3.000	24.612	300	
13	26.911	2.361	Open Manhole	1800	2.004	24.550	300	2.003	24.625	225	
								3.001	24.550	300	
16	26.950	2.550	Open Manhole	1200	4.000	24.400	300				
19	26.950	2.583	Open Manhole	1200	4.001	24.367	300	4.000	24.367	300	
6	26.887	2.897	Open Manhole	3000	1.012	23.990	150	1.011	23.990	675	
								2.004	23.990	300	
								4.001	23.990	300	
8	23.919	0.764	Open Manhole	1200		OUTFALL		1.012	23.155	150	

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PIPELINE SCHEDULES for JNP SWS Pipe Network 1

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)
1.000	o	225	1	28.505	26.695	1.585	Open Manhole	1200
1.001	o	300	2	28.041	25.690	2.051	Open Manhole	1200
1.002	o	375	3	28.417	25.457	2.585	Open Manhole	1500
1.003	[]	-2	BC1a	28.661	24.552	2.909	Open Manhole	1200
1.004	o	375	BC1b	28.696	24.492	3.829	Open Manhole	1200
1.005	o	375	4	28.624	24.474	3.775	Open Manhole	1500
1.006	[]	-2	BC2a	28.594	24.458	2.936	Open Manhole	1200
1.007	o	525	BC2b	27.877	24.346	3.006	Open Manhole	1200
1.008	o	525	5	27.847	24.336	2.986	Open Manhole	1500
1.009	[]	-2	BC3a	27.781	24.315	2.266	Open Manhole	1200
1.010	o	675	BC3b	27.105	24.207	2.223	Open Manhole	1200
1.011	o	675	6	27.076	24.199	2.202	Open Manhole	1500
2.000	o	150	9	34.952	33.450	1.352	Open Manhole	1200
2.001	o	150	10	30.523	27.240	3.133	Open Manhole	1200
2.002	o	150	11	28.469	26.417	1.902	Open Manhole	1200
2.003	o	225	12	27.841	25.975	1.641	Open Manhole	1200
3.000	o	300	14	26.385	24.645	1.440	Open Manhole	1200
3.001	o	300	15	26.385	24.612	1.473	Open Manhole	1200

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)
1.000	12.479	13.4	2	28.041	25.765	2.051	Open Manhole	1200
1.001	38.742	245.2	3	28.417	25.532	2.585	Open Manhole	1500
1.002	19.529	244.1	BC1a	28.661	25.377	2.909	Open Manhole	1200
1.003	30.000	500.0	BC1b	28.696	24.492	3.004	Open Manhole	1200
1.004	4.264	236.9	4	28.624	24.474	3.775	Open Manhole	1500
1.005	4.065	254.1	BC2a	28.594	24.458	3.761	Open Manhole	1200
1.006	56.000	500.0	BC2b	27.877	24.346	2.331	Open Manhole	1200
1.007	2.437	243.7	5	27.847	24.336	2.986	Open Manhole	1500
1.008	5.254	250.2	BC3a	27.781	24.315	2.941	Open Manhole	1200
1.009	54.000	500.0	BC3b	27.105	24.207	1.698	Open Manhole	1200
1.010	2.000	250.0	6	27.076	24.199	2.202	Open Manhole	1500
1.011	15.851	75.8	6	26.887	23.990	2.222	Open Manhole	3000
2.000	107.160	17.3	10	30.523	27.240	3.133	Open Manhole	1200
2.001	49.387	60.0	11	28.469	26.417	1.902	Open Manhole	1200
2.002	15.020	40.9	12	27.841	26.050	1.641	Open Manhole	1200
2.003	30.416	22.5	13	26.911	24.625	2.061	Open Manhole	1800
3.000	5.000	151.5	15	26.385	24.612	1.473	Open Manhole	1200
3.001	9.239	149.0	13	26.911	24.550	2.061	Open Manhole	1800

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PIPELINE SCHEDULES for JNP SWS Pipe Network 1

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)
2.004	o	300	13	26.911	24.550	2.061	Open Manhole	1800
4.000	o	300	16	26.950	24.400	2.250	Open Manhole	1200
4.001	o	300	19	26.950	24.367	2.283	Open Manhole	1200
1.012	o	150	6	26.887	23.990	2.747	Open Manhole	3000

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)
2.004	10.737	19.2	6	26.887	23.990	2.597	Open Manhole	3000
4.000	5.000	151.5	19	26.950	24.367	2.283	Open Manhole	1200
4.001	9.552	25.3	6	26.887	23.990	2.597	Open Manhole	3000
1.012	83.463	100.0	8	23.919	23.155	0.614	Open Manhole	1200

Simulation Criteria for JNP SWS Pipe Network 1

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/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	2
Number of Online Controls	3	Number of Time/Area Diagrams	0
Number of Offline Controls	2	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	1	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	19.500	Storm Duration (mins)	30
Ratio R	0.350		

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Online Controls for JNP SWS Pipe Network 1

Non Return Valve Manhole: 15, DS/PN: 3.001, Volume (m³): 2.3

Non Return Valve Manhole: 19, DS/PN: 4.001, Volume (m³): 3.2

Hydro-Brake® Optimum Manhole: 6, DS/PN: 1.012, Volume (m³): 26.5

Unit Reference	MD-SHE-0104-6500-2050-6500
Design Head (m)	2.050
Design Flow (l/s)	6.5
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	104
Invert Level (m)	23.990
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	2.050	6.5
Flush-Flo™	0.454	5.7
Kick-Flo®	0.930	4.5
Mean Flow over Head Range	-	5.3

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	3.5	1.200	5.1	3.000	7.8	7.000	11.6
0.200	5.1	1.400	5.4	3.500	8.4	7.500	12.0
0.300	5.5	1.600	5.8	4.000	8.9	8.000	12.4
0.400	5.6	1.800	6.1	4.500	9.4	8.500	12.7
0.500	5.7	2.000	6.4	5.000	9.9	9.000	13.1
0.600	5.6	2.200	6.7	5.500	10.3	9.500	13.4
0.800	5.2	2.400	7.0	6.000	10.8		
1.000	4.7	2.600	7.3	6.500	11.2		

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<u>Offline Controls for JNP SWS Pipe Network 1</u> <u>Weir Manhole: 13, DS/PN: 2.004, Loop to PN: 3.000</u> Discharge Coef 0.544 Width (m) 1.800 Invert Level (m) 25.700 <u>Weir Manhole: 6, DS/PN: 1.012, Loop to PN: 4.000</u> Discharge Coef 0.544 Width (m) 3.000 Invert Level (m) 25.700		
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Storage Structures for JNP SWS Pipe Network 1

Cellular Storage Manhole: 14, DS/PN: 3.000

Invert Level (m) 24.915 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	108.0	108.0	1.201	0.0	158.4
1.200	108.0	158.4			

Cellular Storage Manhole: 16, DS/PN: 4.000

Invert Level (m) 24.785 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	149.5	149.5	1.601	0.0	227.9
1.600	149.5	227.9			

JNP Group

3rd Floor, Marlborough House

48 Holly Walk

Leamington Spa CV32 4XP

C85850

Bartons Road, Havant

Phase 1 Surface Water Calcs

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Micro Drainage

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

for JNP SWS Pipe Network 1

Simulation Criteria

Areal Reduction Factor 1.000

Additional Flow - % of Total Flow 0.000

Hot Start (mins) 0

MADD Factor * 10m³/ha Storage 0.000

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 2

Number of Online Controls 3

Number of Time/Area Diagrams 0

Number of Offline Controls 2

Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR

Ratio R 0.350

Region England and Wales Cv (Summer) 0.750

M5-60 (mm) 19.500 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, 240, 360, 480, 960, 1440

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

Climate Change (%) 0, 0, 30

PN	US/MH Name	Event	Duration (mins)	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)
1.000	1	15 minute 1 year Winter I+0%	15	28.505	26.759	-0.161	0.000
1.001	2	15 minute 1 year Winter I+0%	15	28.041	25.836	-0.154	0.000
1.002	3	15 minute 1 year Winter I+0%	15	28.417	25.610	-0.222	0.000
1.003	BC1a	240 minute 1 year Winter I+0%	240	28.661	24.838	-0.914	0.000
1.004	BC1b	240 minute 1 year Winter I+0%	240	28.696	24.838	-0.029	0.000
1.005	4	240 minute 1 year Winter I+0%	240	28.624	24.838	-0.011	0.000
1.006	BC2a	240 minute 1 year Winter I+0%	240	28.594	24.837	-0.821	0.000
1.007	BC2b	240 minute 1 year Winter I+0%	240	27.877	24.837	-0.034	0.000
1.008	5	240 minute 1 year Winter I+0%	240	27.847	24.837	-0.024	0.000
1.009	BC3a	240 minute 1 year Winter I+0%	240	27.781	24.836	-0.679	0.000
1.010	BC3b	240 minute 1 year Winter I+0%	240	27.105	24.836	-0.046	0.000
1.011	6	240 minute 1 year Winter I+0%	240	27.076	24.836	-0.038	0.000
2.000	9	15 minute 1 year Winter I+0%	15	34.952	33.511	-0.089	0.000
2.001	10	15 minute 1 year Winter I+0%	15	30.523	27.350	-0.040	0.000
2.002	11	15 minute 1 year Winter I+0%	15	28.469	26.544	-0.023	0.000
2.003	12	15 minute 1 year Winter I+0%	15	27.841	26.058	-0.142	0.000
3.000	14	60 minute 1 year Winter I+0%	60	26.385	24.645	-0.300	0.000
3.001	15	60 minute 1 year Winter I+0%	60	26.385	24.612	-0.300	0.000
2.004	13	240 minute 1 year Winter I+0%	240	26.911	24.835	-0.015	0.000

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Micro Drainage	Network 2018.1	

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for JNP SWS Pipe Network 1

		US/MH Flow / Overflow		Maximum	Pipe		
				Velocity	Flow		
PN	Name	Cap.	(l/s)	Vol (m³)	(m/s)	(l/s)	Status
1.000	1	0.18		0.066	2.4	21.7	OK
1.001	2	0.46		0.165	0.9	30.3	OK
1.002	3	0.35		0.433	0.9	37.6	OK
1.003	BC1a	0.00		0.318	0.2	9.3	OK
1.004	BC1b	0.10		11.626	0.4	7.9	OK
1.005	4	0.14		0.918	0.5	10.9	OK
1.006	BC2a	0.00		0.699	0.3	10.7	OK
1.007	BC2b	0.03		38.106	0.3	5.6	OK
1.008	5	0.05		1.088	0.4	8.9	OK
1.009	BC3a	0.00		1.361	0.2	8.4	OK
1.010	BC3b	0.02		53.405	0.4	5.1	OK
1.011	6	0.01		1.322	0.5	5.2	OK
2.000	9	0.34		0.064	2.2	14.4	OK
2.001	10	0.86		0.129	1.4	19.3	OK
2.002	11	1.00		0.192	1.7	25.6	OK
2.003	12	0.29		0.089	2.3	30.3	OK
3.000	14	0.00		0.000	0.0	0.0	OK
3.001	15	0.00		0.000	0.0	0.0	OK
2.004	13	0.04	0.0	1.271	1.4	8.3	OK

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Micro Drainage	Network 2018.1	

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for JNP SWS Pipe Network 1

PN	US/MH Name	Event	Duration (mins)	US/CL (m)	Water	Surcharged	Flooded
					Level (m)	Depth (m)	Volume (m ³)
4.000	16	60 minute 1 year Winter I+0%	60	26.950	24.400	-0.300	0.000
4.001	19	60 minute 1 year Winter I+0%	60	26.950	24.367	-0.300	0.000
1.012	6	240 minute 1 year Winter I+0%	240	26.887	24.834	0.694	0.000

PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Maximum Vol (m³)	Maximum	Pipe	Status
					Velocity (m/s)	Flow (l/s)	
4.000	16	0.00		0.000	0.0	0.0	OK
4.001	19	0.00		0.000	0.0	0.0	OK
1.012	6	0.32	0.0	11.881	0.9	5.6	SURCHARGED

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Micro Drainage	Network 2018.1	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for JNP SWS Pipe Network 1

PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Maximum Vol (m³)	Maximum Velocity (m/s)	Pipe Flow (l/s)	Status
1.000	1	0.43		0.112	3.0	53.2	OK
1.001	2	1.20		0.506	1.1	78.7	SURCHARGED
1.002	3	0.94		1.613	1.1	100.0	OK
1.003	BC1a	0.00		2.533	0.2	12.5	OK
1.004	BC1b	0.09		63.941	0.4	7.2	SURCHARGED
1.005	4	0.14		2.410	0.4	11.1	SURCHARGED
1.006	BC2a	0.00		1.655	0.2	10.2	SURCHARGED
1.007	BC2b	0.12		130.470	0.3	20.7	SURCHARGED
1.008	5	0.13		2.568	0.4	20.9	SURCHARGED
1.009	BC3a	0.00		2.372	0.1	13.9	SURCHARGED
1.010	BC3b	0.04		130.674	0.4	12.1	SURCHARGED
1.011	6	0.02		2.825	0.6	11.4	SURCHARGED
2.000	9	0.81		0.176	2.7	34.6	SURCHARGED
2.001	10	1.72		4.053	2.2	38.5	SURCHARGED
2.002	11	1.95		2.190	2.8	50.1	SURCHARGED
2.003	12	0.58		0.145	2.7	59.8	OK
3.000	14	0.00		0.000	0.0	0.0	OK
3.001	15	0.00		0.000	0.0	0.0	OK
2.004	13	0.06	0.0	4.184	1.4	11.3	SURCHARGED

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Micro Drainage	Network 2018.1	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for JNP SWS Pipe Network 1

US/MH		Event	Duration (mins)	US/CL (m)	Water Surcharged Flooded		
PN	Name				Level (m)	Depth (m)	Volume (m³)
4.000	16	60 minute 30 year Winter I+0%	60	26.950	24.400	-0.300	0.000
4.001	19	60 minute 30 year Winter I+0%	60	26.950	24.367	-0.300	0.000
1.012	6	480 minute 30 year Winter I+0%	480	26.887	25.671	1.531	0.000

US/MH		Flow / Overflow		Maximum		Pipe		Status
PN	Name	Cap.	(l/s)	Vol (m³)	Velocity (m/s)	Flow (l/s)		
4.000	16	0.00		0.000	0.0	0.0		OK
4.001	19	0.00		0.000	0.0	0.0		OK
1.012	6	0.34	0.0	17.831	0.9	5.9	SURCHARGED	

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48 Holly Walk

Leamington Spa CV32 4XP

C85850

Bartons Road, Havant

Phase 1 Surface Water Calcs

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Designed by CT

Checked by KM

Micro Drainage

Network 2018.1

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for JNP SWS Pipe Network 1

Simulation Criteria

Areal Reduction Factor 1.000

Additional Flow - % of Total Flow 0.000

Hot Start (mins) 0

MADD Factor * 10m³/ha Storage 0.000

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 2

Number of Online Controls 3

Number of Time/Area Diagrams 0

Number of Offline Controls 2

Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model

FSR

Ratio R 0.350

Region England and Wales Cv (Summer) 0.750

M5-60 (mm)

19.500 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, 240, 360, 480, 960, 1440

Return Period(s) (years)

1, 30, 100

Climate Change (%)

0, 0, 30

PN	US/MH Name	Event	Duration (mins)	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)
1.000	1	15 minute 100 year Winter I+30%	15	28.505	27.078	0.158	0.000
1.001	2	15 minute 100 year Winter I+30%	15	28.041	26.590	0.600	0.000
1.002	3	120 minute 100 year Winter I+30%	120	28.417	26.212	0.380	0.000
1.003	BC1a	120 minute 100 year Winter I+30%	120	28.661	26.116	0.364	0.000
1.004	BC1b	120 minute 100 year Winter I+30%	120	28.696	26.115	1.248	0.000
1.005	4	480 minute 100 year Winter I+30%	480	28.624	26.052	1.203	0.000
1.006	BC2a	480 minute 100 year Winter I+30%	480	28.594	26.051	0.393	0.000
1.007	BC2b	480 minute 100 year Winter I+30%	480	27.877	26.051	1.180	0.000
1.008	5	480 minute 100 year Winter I+30%	480	27.847	26.051	1.190	0.000
1.009	BC3a	480 minute 100 year Winter I+30%	480	27.781	26.050	0.535	0.000
1.010	BC3b	480 minute 100 year Winter I+30%	480	27.105	26.050	1.168	0.000
1.011	6	480 minute 100 year Winter I+30%	480	27.076	26.050	1.176	0.000
2.000	9	15 minute 100 year Winter I+30%	15	34.952	34.955	1.355	3.498
2.001	10	30 minute 100 year Winter I+30%	30	30.523	30.528	3.138	5.394
2.002	11	15 minute 100 year Winter I+30%	15	28.469	28.469	1.902	0.342
2.003	12	60 minute 100 year Winter I+30%	60	27.841	26.233	0.033	0.000
3.000	14	480 minute 100 year Winter I+30%	480	26.385	26.050	1.105	0.000
3.001	15	480 minute 100 year Winter I+30%	480	26.385	26.050	1.138	0.000
2.004	13	480 minute 100 year Winter I+30%	480	26.911	26.050	1.200	0.000

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Micro Drainage	Network 2018.1	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for JNP SWS Pipe Network 1

PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Maximum Vol (m³)	Maximum Velocity (m/s)	Pipe Flow (l/s)	Status
1.000	1	0.72		0.428	3.2	88.0	SURCHARGED
1.001	2	1.99		1.353	1.8	130.1	SURCHARGED
1.002	3	0.55		3.968	1.0	59.1	SURCHARGED
1.003	BC1a	0.02		3.771	0.2	57.7	SURCHARGED
1.004	BC1b	0.56		72.320	0.5	44.6	SURCHARGED
1.005	4	0.40		3.101	0.4	32.2	SURCHARGED
1.006	BC2a	0.01		2.096	0.2	28.9	SURCHARGED
1.007	BC2b	0.16		136.048	0.3	27.4	SURCHARGED
1.008	5	0.23		3.257	0.4	37.9	SURCHARGED
1.009	BC3a	0.01		2.802	0.2	37.9	SURCHARGED
1.010	BC3b	0.13		131.310	0.4	37.9	SURCHARGED
1.011	6	0.09		3.495	0.6	50.9	SURCHARGED
2.000	9	0.85		5.177	2.7	36.0	FLOOD
2.001	10	1.92		10.057	2.4	43.1	FLOOD
2.002	11	2.49		3.509	3.6	64.1	FLOOD
2.003	12	0.66		0.356	2.8	68.0	SURCHARGED
3.000	14	0.07		118.001	0.4	4.4	SURCHARGED
3.001	15	0.06		1.890	0.1	3.5	SURCHARGED
2.004	13	0.10	22.9	5.438	1.3	19.1	SURCHARGED

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Micro Drainage	Network 2018.1	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for JNP SWS Pipe Network 1

US/MH		Event	Duration (mins)	US/CL (m)	Water	Surcharged	Flooded
PN	Name				Level (m)	Depth (m)	Volume (m ³)
4.000	16	480 minute 100 year Winter I+30%	480	26.950	26.049	1.349	0.000
4.001	19	480 minute 100 year Winter I+30%	480	26.950	26.049	1.382	0.000
1.012	6	480 minute 100 year Winter I+30%	480	26.887	26.049	1.909	0.000

US/MH		Flow / Overflow		Maximum		Pipe	Status
PN	Name	Cap.	(l/s)	Vol (m ³)	Velocity (m/s)	Flow (l/s)	
4.000	16	0.09		181.345	0.4	5.2	SURCHARGED
4.001	19	0.03		2.165	0.1	4.7	SURCHARGED
1.012	6	0.37	42.0	20.505	0.9	6.5	SURCHARGED