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11 Tungsten Building George Street Fishersgate BN41 1RA	Manor Nursery Angmering West Sussex	
Date 28/06/2019 File Planning Network File.MDX	Designed by S Burgess Checked by SRD	
Innovyze	Network 2017.1.2	

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for NETWORK 1.SWS

Pipe Sizes NETWORK 9 Manhole Sizes NETWORK 9

FSR Rainfall Model - England and Wales

Return Period (years)	2	PIMP (%)	100
M5-60 (mm)	19.600	Add Flow / Climate Change (%)	0
Ratio R	0.350	Minimum Backdrop Height (m)	0.500
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	1.000
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)	0.75
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Network Design Table for NETWORK 1.SWS

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	20.697	0.202	102.5	0.013	5.00	0.0	0.600	o	100	Pipe/Conduit	
1.001	6.648	0.077	86.3	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	
1.002	6.073	0.374	16.2	0.009	0.00	0.0	0.600	o	100	Pipe/Conduit	
2.000	8.048	0.337	23.9	0.016	5.00	0.0	0.600	o	100	Pipe/Conduit	
1.003	13.287	0.149	89.2	0.008	0.00	0.0	0.600	o	100	Pipe/Conduit	
1.004	20.099	0.115	174.8	0.008	0.00	0.0	0.600	o	150	Pipe/Conduit	
3.000	23.611	0.229	103.1	0.017	5.00	0.0	0.600	o	100	Pipe/Conduit	
3.001	3.105	0.030	103.5	0.005	0.00	0.0	0.600	o	100	Pipe/Conduit	
4.000	11.118	0.595	18.7	0.012	5.00	0.0	0.600	o	100	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	5.45	15.366	0.013	0.0	0.0	0.0	0.76	6.0	1.8
1.001	50.00	5.59	15.164	0.013	0.0	0.0	0.0	0.83	6.5	1.8
1.002	50.00	5.64	15.087	0.022	0.0	0.0	0.0	1.93	15.1	3.0
2.000	50.00	5.08	15.050	0.016	0.0	0.0	0.0	1.59	12.5	2.2
1.003	50.00	5.91	14.713	0.046	0.0	0.0	0.0	0.81	6.4	6.2
1.004	50.00	6.35	14.514	0.054	0.0	0.0	0.0	0.76	13.4	7.3
3.000	50.00	5.52	14.183	0.017	0.0	0.0	0.0	0.76	5.9	2.3
3.001	50.00	5.59	13.960	0.022	0.0	0.0	0.0	0.76	5.9	3.0
4.000	50.00	5.10	14.525	0.012	0.0	0.0	0.0	1.80	14.1	1.6

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Network Design Table for NETWORK 1.SWS

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
3.002	24.981	0.243	102.8	0.003	0.00	0.0	0.600	o	100	Pipe/Conduit	
3.003	2.503	0.087	28.8	0.004	0.00	0.0	0.600	o	100	Pipe/Conduit	
1.005	4.226	0.024	176.1	0.003	0.00	0.0	0.600	o	100	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)
3.002	50.00	6.14	13.930	0.037	0.0	0.0	0.0	0.76	6.0	5.0
3.003	50.00	6.17	13.607	0.041	0.0	0.0	0.0	1.44	11.3	5.6
1.005	50.00	6.45	13.550	0.098	0.0	0.0	0.0	0.75	13.3	13.3

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PIPELINE SCHEDULES for NETWORK 1.SWS

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	100	101	16.666	15.366	1.200	Open Manhole	1200
1.001	o	100	102	16.464	15.164	1.200	Open Manhole	1200
1.002	o	100	103	16.387	15.087	1.200	Open Manhole	1200
2.000	o	100	104	16.350	15.050	1.200	Open Manhole	1200
1.003	o	100	105	16.322	14.713	1.509	Open Manhole	1200
1.004	o	150	106	16.220	14.514	1.556	Open Manhole	1200
3.000	o	100	107	15.489	14.189	1.200	Open Manhole	1200
3.001	o	100	108	15.732	13.960	1.672	Open Manhole	1200
4.000	o	100	109	15.825	14.525	1.200	Open Manhole	1200
3.002	o	100	110	15.717	13.930	1.687	Open Manhole	1200
3.003	o	100	111	15.974	13.687	2.187	Open Manhole	1200
1.005	o	150	112	16.008	13.550	2.308	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	20.697	102.5	102	16.464	15.164	1.200	Open Manhole	1200
1.001	6.648	86.3	103	16.387	15.087	1.200	Open Manhole	1200
1.002	6.073	16.2	105	16.322	14.713	1.509	Open Manhole	1200
2.000	8.048	23.9	105	16.322	14.713	1.509	Open Manhole	1200
1.003	13.287	89.2	106	16.220	14.564	1.556	Open Manhole	1200
1.004	20.099	174.8	112	16.008	14.399	1.459	Open Manhole	1200
3.000	23.611	103.1	108	15.732	13.960	1.672	Open Manhole	1200
3.001	3.105	103.5	110	15.717	13.930	1.687	Open Manhole	1200
4.000	11.118	18.7	110	15.717	13.930	1.687	Open Manhole	1200
3.002	24.981	102.8	111	15.974	13.687	2.187	Open Manhole	1200
3.003	2.503	28.8	112	16.008	13.600	2.308	Open Manhole	1200
1.005	4.226	176.1	113	15.964	13.526	2.288	Open Manhole	0

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<u>Summary of Critical Results by Maximum Level (Rank 1) for NETWORK 1.SWS</u> <u>Simulation Criteria</u> 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 0 Number of Online Controls 0 Number of Time/Area Diagrams 0 Number of Offline Controls 0 Number of Real Time Controls 0 <u>Synthetic Rainfall Details</u> 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 DVD Status OFF Analysis Timestep Fine Inertia Status OFF DTS Status ON Profile(s) Summer and Winter Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440 Return Period(s) (years) 100 Climate Change (%) 40																																																																																																																																																																		
<table><tr><th colspan="2"></th><th colspan="2"></th><th colspan="2"></th><th colspan="2"></th><th colspan="2"></th><th>Water</th></tr><tr><th>PN</th><th>US/MH Name</th><th>Storm</th><th>Return Period</th><th>Climate Change</th><th>First (X) Surge</th><th>First (Y) Flood</th><th>First (Z) Overflow</th><th>Overflow Act.</th><th></th><th>Level (m)</th></tr><tr><td>1.000</td><td>101</td><td>15 Winter</td><td>100</td><td>+40%</td><td>100/15 Summer</td><td></td><td></td><td></td><td></td><td>15.831</td></tr><tr><td>1.001</td><td>102</td><td>15 Winter</td><td>100</td><td>+40%</td><td>100/15 Summer</td><td></td><td></td><td></td><td></td><td>15.721</td></tr><tr><td>1.002</td><td>103</td><td>15 Winter</td><td>100</td><td>+40%</td><td>100/15 Summer</td><td></td><td></td><td></td><td></td><td>15.680</td></tr><tr><td>2.000</td><td>104</td><td>15 Winter</td><td>100</td><td>+40%</td><td>100/15 Summer</td><td></td><td></td><td></td><td></td><td>15.705</td></tr><tr><td>1.003</td><td>105</td><td>15 Winter</td><td>100</td><td>+40%</td><td>100/15 Summer</td><td></td><td></td><td></td><td></td><td>15.600</td></tr><tr><td>1.004</td><td>106</td><td>15 Winter</td><td>100</td><td>+40%</td><td>100/15 Summer</td><td></td><td></td><td></td><td></td><td>14.767</td></tr><tr><td>3.000</td><td>107</td><td>15 Winter</td><td>100</td><td>+40%</td><td>100/15 Summer</td><td></td><td></td><td></td><td></td><td>15.057</td></tr><tr><td>3.001</td><td>108</td><td>15 Winter</td><td>100</td><td>+40%</td><td>100/15 Summer</td><td></td><td></td><td></td><td></td><td>14.852</td></tr><tr><td>4.000</td><td>109</td><td>15 Winter</td><td>100</td><td>+40%</td><td>100/15 Summer</td><td></td><td></td><td></td><td></td><td>14.839</td></tr><tr><td>3.002</td><td>110</td><td>15 Winter</td><td>100</td><td>+40%</td><td>100/15 Summer</td><td></td><td></td><td></td><td></td><td>14.793</td></tr><tr><td>3.003</td><td>111</td><td>15 Winter</td><td>100</td><td>+40%</td><td>100/15 Summer</td><td></td><td></td><td></td><td></td><td>14.046</td></tr><tr><td>1.005</td><td>112</td><td>15 Winter</td><td>100</td><td>+40%</td><td>100/15 Summer</td><td></td><td></td><td></td><td></td><td>13.889</td></tr></table>																			Water	PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.		Level (m)	1.000	101	15 Winter	100	+40%	100/15 Summer					15.831	1.001	102	15 Winter	100	+40%	100/15 Summer					15.721	1.002	103	15 Winter	100	+40%	100/15 Summer					15.680	2.000	104	15 Winter	100	+40%	100/15 Summer					15.705	1.003	105	15 Winter	100	+40%	100/15 Summer					15.600	1.004	106	15 Winter	100	+40%	100/15 Summer					14.767	3.000	107	15 Winter	100	+40%	100/15 Summer					15.057	3.001	108	15 Winter	100	+40%	100/15 Summer					14.852	4.000	109	15 Winter	100	+40%	100/15 Summer					14.839	3.002	110	15 Winter	100	+40%	100/15 Summer					14.793	3.003	111	15 Winter	100	+40%	100/15 Summer					14.046	1.005	112	15 Winter	100	+40%	100/15 Summer					13.889
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<u>Summary of Critical Results by Maximum Level (Rank 1) for NETWORK 1.SWS</u>								
PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.003	105	0.787	0.000	2.38		14.4	SURCHARGED	
1.004	106	0.103	0.000	1.39		17.5	SURCHARGED	
3.000	107	0.768	0.000	0.99		5.7	SURCHARGED	
3.001	108	0.792	0.000	1.33		6.4	SURCHARGED	
4.000	109	0.214	0.000	0.48		6.3	SURCHARGED	
3.002	110	0.769	0.000	1.77		10.2	SURCHARGED	
3.003	111	0.259	0.000	1.36		11.1	SURCHARGED	
1.005	112	0.189	0.000	2.79		29.2	SURCHARGED	
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