

Pinnacle Consulting Engineers Limited		Page 16
Pinnacle House 3 Meridian Way Norwich NR7 0TA	Havant Catchment A, B and F	
Date 04/05/2021 File SW NETWORK 1.MDX	Designed by iran.limbu Checked by	
XP Solutions	Network 2017.1.2	

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water	Surcharged
									Level (m)	Depth (m)
9.005	QMAX	30 Winter	30	+0%	1/15 Summer				14.278	0.488
5.006	S3	30 Winter	30	+0%	30/15 Summer				14.016	0.169
5.007	S4	30 Winter	30	+0%	30/15 Summer				13.991	0.190
5.008	S5	30 Winter	30	+0%	30/15 Summer				13.881	0.222
5.009	S6	30 Winter	30	+0%	30/15 Summer				13.832	0.196
5.010	S8	30 Winter	30	+0%	30/15 Summer	100/15 Summer			13.732	0.321
11.000	S14	15 Winter	30	+0%	30/15 Summer	100/15 Summer			13.951	0.167
11.001	S15	30 Winter	30	+0%	30/15 Summer				13.769	0.443
5.011	S9	30 Winter	30	+0%	30/15 Summer	100/15 Summer			13.646	0.295
5.012	S10	15 Winter	30	+0%	30/15 Summer	100/15 Winter			13.543	0.202
12.000	ATT	240 Winter	30	+0%	100/60 Winter				13.244	-0.139
5.013	S11	30 Winter	30	+0%	30/15 Summer				13.477	0.244
5.014	S12	30 Winter	30	+0%					12.693	-0.203
5.015	S13	30 Winter	30	+0%					12.586	-0.214

PN	US/MH Name	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level
							Exceeded
9.005	QMAX	0.000	1.38		35.5	SURCHARGED*	
5.006	S3	0.000	0.62		116.9	SURCHARGED	
5.007	S4	0.000	0.54		136.2	SURCHARGED	
5.008	S5	0.000	1.05		134.0	SURCHARGED	
5.009	S6	0.000	0.59		181.4	SURCHARGED	
5.010	S8	0.000	1.10		184.3	SURCHARGED	4
11.000	S14	0.000	0.77		74.0	SURCHARGED	4
11.001	S15	0.000	0.75		84.4	SURCHARGED	
5.011	S9	0.000	2.94		255.8	SURCHARGED	4
5.012	S10	0.000	1.11		241.8	SURCHARGED	
12.000	ATT	0.000	0.27		31.1	OK	
5.013	S11	0.000	0.32		100.8	SURCHARGED	
5.014	S12	0.000	0.58		100.8	OK	
5.015	S13	0.000	0.54		100.7	OK	

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XP Solutions	Network 2017.1.2	

100 year Return Period 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 Offline Controls 0 Number of Time/Area Diagrams 0
 Number of Online Controls 2 Number of Storage Structures 1 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH D3 (1km) 0.387
 FEH Rainfall Version 1999 E (1km) 0.310
 Site Location GB 472400 107400 SU 72400 07400 F (1km) 2.252
 C (1km) -0.029 Cv (Summer) 0.750
 D1 (1km) 0.457 Cv (Winter) 0.840
 D2 (1km) 0.295

 Margin for Flood Risk Warning (mm) 300.0
 Analysis Timestep 2.5 Second Increment (Extended)
 DTS Status ON
 DVD Status ON
 Inertia Status ON

 Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
 Return Period(s) (years) 1, 30, 100
 Climate Change (%) 0, 0, 20

PN	US/MH		Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level	Surcharged Depth	Flooded Volume
	Name	Storm							(m)	(m)	(m³)
5.000	QMAX 15	Winter	100	+20%	100/15	Winter			13.999	0.180	0.000
5.001	QMAX 15	Winter	100	+20%	100/15	Winter			13.997	0.203	0.000
5.002	QMAX 15	Winter	100	+20%	100/15	Winter			13.996	0.227	0.000
5.003	QMAX 15	Winter	100	+20%	100/15	Winter			13.993	0.249	0.000
6.000	QMAX 15	Winter	100	+20%	100/15	Winter			13.992	0.173	0.000
5.004	S1 15	Winter	100	+20%	30/15	Summer			13.990	1.021	0.000
7.000	QMAX 15	Winter	100	+20%					14.753	-0.347	0.000
7.001	QMAX 15	Winter	100	+20%	100/15	Summer	100/15	Winter	14.700	0.200	0.192
7.002	QMAX 30	Winter	100	+20%	100/15	Summer	100/15	Summer	14.650	0.225	25.255
7.003	QMAX 30	Winter	100	+20%	100/15	Summer	100/15	Summer	14.645	0.320	20.136
8.000	QMAX 30	Winter	100	+20%	100/15	Summer			14.640	0.040	0.000
7.004	QMAX 30	Winter	100	+20%	1/15	Summer	100/15	Summer	14.640	1.065	14.675
5.005	S2 15	Winter	100	+20%	30/15	Summer	100/15	Summer	14.664	0.844	3.985
9.000	QMAX 30	Winter	100	+20%					14.840	-0.360	0.000
9.001	QMAX 30	Winter	100	+20%					14.840	-0.335	0.000
9.002	QMAX 30	Winter	100	+20%					14.838	-0.312	0.000
9.003	QMAX 30	Winter	100	+20%					14.833	-0.292	0.000
9.004	QMAX 30	Winter	100	+20%	30/15	Summer			14.826	0.476	0.000
10.000	QMAX 60	Winter	100	+20%					14.782	-0.318	0.000
10.001	QMAX 60	Winter	100	+20%	100/30	Winter			14.781	0.141	0.000
10.002	QMAX 60	Winter	100	+20%	100/15	Winter			14.778	0.168	0.000
10.003	QMAX 60	Winter	100	+20%	100/15	Winter			14.775	0.195	0.000

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XP Solutions	Network 2017.1.2	

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

PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
5.000	QMAX	0.14		29.8	FLOOD RISK	
5.001	QMAX	0.11		36.1	FLOOD RISK*	
5.002	QMAX	0.14		46.5	FLOOD RISK*	
5.003	QMAX	0.17		54.7	FLOOD RISK*	
6.000	QMAX	0.05		27.6	FLOOD RISK	
5.004	S1	11.87		65.0	FLOOD RISK*	
7.000	QMAX	0.07		79.3	OK	
7.001	QMAX	0.24		129.6	FLOOD	2
7.002	QMAX	0.18		99.4	FLOOD	12
7.003	QMAX	0.25		77.6	FLOOD	12
8.000	QMAX	0.03		20.1	FLOOD RISK	
7.004	QMAX	3.84		56.5	FLOOD	11
5.005	S2	1.29		117.6	FLOOD	4
9.000	QMAX	0.06		16.7	OK	
9.001	QMAX	0.07		22.1	OK	
9.002	QMAX	0.08		25.7	OK	
9.003	QMAX	0.08		26.6	OK	
9.004	QMAX	0.93		24.4	SURCHARGED*	
10.000	QMAX	0.02		18.3	OK	
10.001	QMAX	0.07		22.7	FLOOD RISK*	
10.002	QMAX	0.07		22.6	FLOOD RISK*	
10.003	QMAX	0.09		28.3	FLOOD RISK*	

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Date 04/05/2021	Designed by iran.limbu	
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XP Solutions	Network 2017.1.2	

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water	Surcharged
									Level (m)	Depth (m)
9.005	QMAX	60 Winter	100	+20%	1/15 Summer				14.771	0.981
5.006	S3	15 Winter	100	+20%	30/15 Summer				14.690	0.843
5.007	S4	15 Winter	100	+20%	30/15 Summer				14.690	0.889
5.008	S5	15 Winter	100	+20%	30/15 Summer				14.629	0.970
5.009	S6	15 Winter	100	+20%	30/15 Summer				14.588	0.952
5.010	S8	15 Summer	100	+20%	30/15 Summer	100/15 Summer			14.380	0.969
11.000	S14	15 Winter	100	+20%	30/15 Summer	100/15 Summer			14.817	1.033
11.001	S15	15 Winter	100	+20%	30/15 Summer				14.502	1.176
5.011	S9	15 Winter	100	+20%	30/15 Summer	100/15 Summer			14.217	0.866
5.012	S10	15 Summer	100	+20%	30/15 Summer	100/15 Winter			13.931	0.590
12.000	ATT	240 Winter	100	+20%	100/60 Winter				13.534	0.151
5.013	S11	180 Winter	100	+20%	30/15 Summer				13.814	0.581
5.014	S12	240 Winter	100	+20%					12.720	-0.176
5.015	S13	240 Winter	100	+20%					12.609	-0.191

PN	US/MH Name	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level
							Exceeded
9.005	QMAX	0.000	1.49		38.4	FLOOD RISK*	
5.006	S3	0.000	0.82		154.5	FLOOD RISK	
5.007	S4	0.000	0.62		156.8	FLOOD RISK	
5.008	S5	0.000	1.25		159.1	FLOOD RISK	
5.009	S6	0.000	0.89		272.3	FLOOD RISK	
5.010	S8	0.201	1.54		257.3	FLOOD	4
11.000	S14	8.747	1.06		101.9	FLOOD	4
11.001	S15	0.000	1.37		154.0	FLOOD RISK	
5.011	S9	2.440	4.81		418.5	FLOOD	4
5.012	S10	0.000	1.91		415.9	FLOOD RISK	
12.000	ATT	0.000	0.49		57.1	SURCHARGED	
5.013	S11	0.000	0.37		116.4	FLOOD RISK	
5.014	S12	0.000	0.67		116.6	OK	
5.015	S13	0.000	0.62		116.3	OK	

Alchemy		Page 1
Bessemer Road Welwyn Garden City Hertfordshire AL7 1HE	Havant Catchment C and D	
Date 06/08/2021	Designed by sudeep.chongbang	
File SW Network 2 (updated).MDX	Checked by	
XP Solutions	Network 2017.1.2	

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FEH Rainfall Model	
Return Period (years)	2
FEH Rainfall Version	1999
Site Location GB 472400 107400 SU 72400 07400	
C (1km)	-0.029
D1 (1km)	0.457
D2 (1km)	0.295
D3 (1km)	0.387
E (1km)	0.310
F (1km)	2.252
Maximum Rainfall (mm/hr)	50
Maximum Time of Concentration (mins)	30
Foul Sewage (l/s/ha)	0.000
Volumetric Runoff Coeff.	0.750
PIMP (%)	100
Add Flow / Climate Change (%)	0
Minimum Backdrop Height (m)	0.200
Maximum Backdrop Height (m)	1.500
Min Design Depth for Optimisation (m)	1.200
Min Vel for Auto Design only (m/s)	1.00
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	44.103	0.176	250.0	0.075	4.00	0.0	0.600	o	375	Pipe/Conduit	
1.001	45.915	0.184	250.0	0.159	0.00	0.0	0.600	o	375	Pipe/Conduit	
1.002	41.677	0.167	250.0	0.189	0.00	0.0	0.600	o	375	Pipe/Conduit	
1.003	48.155	0.193	249.5	0.158	0.00	0.0	0.600	o	375	Pipe/Conduit	
2.000	61.502	0.246	250.0	0.076	4.00	0.0	0.600	o	375	Pipe/Conduit	
2.001	43.052	0.172	250.0	0.160	0.00	0.0	0.600	o	375	Pipe/Conduit	
2.002	29.320	0.117	250.0	0.187	0.00	0.0	0.600	o	375	Pipe/Conduit	
2.003	43.356	0.173	250.6	0.192	0.00	0.0	0.600	o	375	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	49.79	4.64	13.800	0.075	0.0	0.0	0.0	1.14	126.1	10.1
1.001	46.14	5.31	13.624	0.235	0.0	0.0	0.0	1.14	126.1	29.3
1.002	43.41	5.92	13.440	0.423	0.0	0.0	0.0	1.14	126.1	49.8
1.003	40.76	6.63	13.273	0.581	0.0	0.0	0.0	1.14	126.2	64.2
2.000	48.31	4.90	13.815	0.076	0.0	0.0	0.0	1.14	126.1	10.0
2.001	45.14	5.53	13.569	0.236	0.0	0.0	0.0	1.14	126.1	28.9
2.002	43.28	5.95	13.397	0.424	0.0	0.0	0.0	1.14	126.1	49.6
2.003	40.88	6.59	13.280	0.615	0.0	0.0	0.0	1.14	125.9	68.1