


Baynham Meikle Partnership		Page 1
8 Meadow Road Edgbaston, Birmingham B 17 8BU	PLOT 5100 HATFIELD BUSINESS PARK 12690 / 104 H	
Date 09/02/2021 12:30 File 28.01.2021 NETWORK - 12...	Designed by JH Checked by GL	
Micro Drainage	Network 2020.1	

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)	1	PIMP (%)	100
M5-60 (mm)	20.000	Add Flow / Climate Change (%)	0
Ratio R	0.433	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)	0.900
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
















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	24.702	0.235	105.1	0.038	6.00	0.0	0.600	o	300	Pipe/Conduit	
2.000	15.738	0.160	98.4	0.038	6.00	0.0	0.600	o	300	Pipe/Conduit	
1.001	49.713	0.380	130.8	0.089	0.00	0.0	0.600	o	300	Pipe/Conduit	
3.000	74.094	0.495	149.7	0.080	6.00	0.0	0.600	Q90	-7	Pipe/Conduit	
1.002	20.174	0.155	130.2	0.074	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.003	17.175	0.225	76.3	0.074	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.004	29.043	0.095	305.7	0.074	0.00	0.0	0.600	o	375	Pipe/Conduit	
4.000	31.210	0.250	124.8	0.165	6.00	0.0	0.600	o	375	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	6.27	74.200	0.038	0.0	0.0	0.0	1.53	108.4	5.1
2.000	50.00	6.17	74.125	0.038	0.0	0.0	0.0	1.59	112.1	5.1
1.001	48.89	6.87	73.965	0.165	0.0	0.0	0.0	1.37	97.1	21.8
3.000	50.00	6.57	74.465	0.080	0.0	0.0	0.0	2.18	903.1	10.8
1.002	48.02	7.12	73.585	0.319	0.0	0.0	0.0	1.38	97.3	41.5
1.003	47.48	7.28	73.430	0.393	0.0	0.0	0.0	1.80	127.3	50.5
1.004	45.94	7.74	73.130	0.467	0.0	0.0	0.0	1.03	113.9	58.1
4.000	50.00	6.32	73.455	0.165	0.0	0.0	0.0	1.62	179.0	22.3


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Network Design Table for Storm




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
4.001	22.687	0.160	141.8	0.165	0.00	0.0	0.600	o	375	Pipe/Conduit	
1.005	15.066	0.125	120.5	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.006	9.489	0.080	118.6	0.107	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.007	16.161	0.760	21.3	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
5.000	23.643	0.255	92.7	0.043	6.00	0.0	0.600	o	225	Pipe/Conduit	
5.001	26.848	0.938	28.6	0.043	0.00	0.0	0.600	o	225	Pipe/Conduit	
5.002	21.856	0.050	437.1	0.204	0.00	0.0	0.600	o	600	Pipe/Conduit	
5.003	28.875	0.060	481.3	0.102	0.00	0.0	0.600	o	600	Pipe/Conduit	
6.000	8.720	0.040	218.0	0.102	6.00	0.0	0.600	o	300	Pipe/Conduit	
5.004	17.529	0.035	500.8	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit	
7.000	16.301	0.110	148.2	0.105	6.00	0.0	0.600	o	300	Pipe/Conduit	
7.001	19.721	0.130	151.7	0.025	0.00	0.0	0.600	o	300	Pipe/Conduit	
8.000	11.684	0.065	179.8	0.124	6.00	0.0	0.600	o	300	Pipe/Conduit	
7.002	24.527	0.415	59.1	0.044	0.00	0.0	0.600	o	375	Pipe/Conduit	
7.003	15.371	1.245	12.3	0.116	0.00	0.0	0.600	o	375	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)
4.001	50.00	6.57	73.120	0.330	0.0	0.0	0.0	1.52	167.8	44.7
1.005	45.52	7.88	72.960	0.797	0.0	0.0	0.0	1.85	294.4	98.3
1.006	45.26	7.97	72.835	0.904	0.0	0.0	0.0	1.87	296.7	110.8
1.007	45.07	8.03	72.755	0.904	0.0	0.0	0.0	4.42	703.6	110.8
5.000	50.00	6.29	73.555	0.043	0.0	0.0	0.0	1.36	54.0	5.8
5.001	50.00	6.47	73.300	0.086	0.0	0.0	0.0	2.45	97.6	11.6
5.002	49.20	6.79	71.987	0.290	0.0	0.0	0.0	1.16	327.5	38.6
5.003	47.65	7.22	71.940	0.392	0.0	0.0	0.0	1.10	312.0	50.6
6.000	50.00	6.14	72.220	0.102	0.0	0.0	0.0	1.06	75.0	13.8
5.004	46.75	7.49	71.880	0.494	0.0	0.0	0.0	1.08	305.7	62.5
7.000	50.00	6.21	74.045	0.105	0.0	0.0	0.0	1.29	91.1	14.2
7.001	50.00	6.47	73.935	0.130	0.0	0.0	0.0	1.27	90.1	17.6
8.000	50.00	6.17	73.870	0.124	0.0	0.0	0.0	1.17	82.7	16.8
7.002	49.74	6.64	73.730	0.298	0.0	0.0	0.0	2.36	260.7	40.1
7.003	49.55	6.69	73.315	0.414	0.0	0.0	0.0	5.18	572.2	55.6


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Network Design Table for Storm

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
1.008	33.961	0.075	452.8	0.190	0.00	0.0	0.600	o	600	Pipe/Conduit	
9.000	32.380	0.325	99.6	0.034	6.00	0.0	0.600	o	225	Pipe/Conduit	
1.009	11.742	0.355	33.1	0.000	0.00	0.0	0.600	o	450	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)
1.008	43.68	8.52	71.845	2.002	0.0	0.0	0.0	1.14	321.7	236.8
9.000	50.00	6.41	73.875	0.034	0.0	0.0	0.0	1.31	52.1	4.6
1.009	43.53	8.58	71.770	2.036	0.0	0.0	0.0	3.54	563.8	240.0

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Manhole Schedules for Storm

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)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
SMH1	75.500	1.300	Open Manhole	1200	1.000	74.200	300				
SMH2	75.450	1.325	Open Manhole	1200	2.000	74.125	300				
SMH3	75.450	1.485	Open Manhole	1200	1.001	73.965	300	1.000	73.965	300	
ACO 900	75.415	0.950	Open Manhole	100	3.000	74.465	-7	2.000	73.965	300	
SMH5	75.400	1.815	Open Manhole	1200	1.002	73.585	300	1.001	73.585	300	
								3.000	73.970	-7	985
SMH6	75.325	1.895	Open Manhole	1200	1.003	73.430	300	1.002	73.430	300	
SMH7	75.415	2.285	Open Manhole	1350	1.004	73.130	375	1.003	73.205	300	
SMH8	75.040	1.585	Open Manhole	1350	4.000	73.455	375				
SMH9	74.930	1.810	Open Manhole	1350	4.001	73.120	375	4.000	73.205	375	85
SMH10	75.000	2.040	Open Manhole	1350	1.005	72.960	450	1.004	73.035	375	
								4.001	72.960	375	
SMH11	74.945	2.110	Open Manhole	1350	1.006	72.835	450	1.005	72.835	450	
SMH12	74.955	2.200	Open Manhole	1350	1.007	72.755	450	1.006	72.755	450	
SMH13	74.980	1.425	Open Manhole	1200	5.000	73.555	225				
SMH14	75.035	1.735	Open Manhole	1200	5.001	73.300	225	5.000	73.300	225	
TANK	74.935	2.948	Open Manhole	100	5.002	71.987	600	5.001	72.362	225	
SMH15	74.935	2.998	Open Manhole	1500	5.003	71.940	600	5.002	71.937	600	
SMH16	75.070	2.850	Open Manhole	1200	6.000	72.220	300				
SMH17	74.890	3.010	Open Manhole	1500	5.004	71.880	600	5.003	71.880	600	
								6.000	72.180	300	
SMH18	75.400	1.355	Open Manhole	1200	7.000	74.045	300				
SMH19	75.400	1.465	Open Manhole	1200	7.001	73.935	300	7.000	73.935	300	
SMH20	75.300	1.430	Open Manhole	1200	8.000	73.870	300				
SMH21	75.120	1.390	Open Manhole	1350	7.002	73.730	375	7.001	73.805	300	
								8.000	73.805	300	
SMH22	74.890	1.575	Open Manhole	1350	7.003	73.315	375	7.002	73.315	375	
SMH23	74.890	3.045	Open Manhole	1500	1.008	71.845	600	1.007	71.995	450	
								5.004	71.845	600	
								7.003	72.070	375	
SMH24	75.000	1.125	Open Manhole	1200	9.000	73.875	225				
SMH25 HB	75.000	3.230	Open Manhole	2100	1.009	71.770	450	1.008	71.770	600	
								9.000	73.550	225	1555
	74.520	3.105	Open Manhole	0		OUTFALL		1.009	71.415	450	

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Manhole Schedules for Storm

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
SMH1	521428.518	209205.935	521428.518	209205.935	Required	
SMH2	521442.315	209231.933	521442.315	209231.933	Required	
SMH3	521426.636	209230.566	521426.636	209230.566	Required	
ACO 900	521450.723	209234.665	521450.723	209234.665	Required	
SMH5	521377.111	209226.248	521377.111	209226.248	Required	
SMH6	521378.648	209206.133	521378.648	209206.133	Required	
SMH7	521379.956	209189.008	521379.956	209189.008	Required	
SMH8	521349.223	209202.633	521349.223	209202.633	Required	
SMH9	521367.341	209177.220	521367.341	209177.220	Required	
SMH10	521382.169	209160.050	521382.169	209160.050	Required	
SMH11	521390.916	209147.783	521390.916	209147.783	Required	
SMH12	521398.952	209142.576	521398.952	209142.576	Required	
SMH13	521311.732	209185.620	521311.732	209185.620	Required	
SMH14	521330.984	209199.345	521330.984	209199.345	Required	
TANK	521350.176	209180.569	521350.176	209180.569	Required	

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Micro Drainage

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Manhole Schedules for Storm

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
SMH15	521365.910	209165.398	521365.910	209165.398	Required	
SMH16	521375.571	209136.825	521375.571	209136.825	Required	
SMH17	521382.672	209141.887	521382.672	209141.887	Required	
SMH18	521458.595	209140.595	521458.595	209140.595	Required	
SMH19	521443.526	209134.379	521443.526	209134.379	Required	
SMH20	521435.181	209154.927	521435.181	209154.927	Required	
SMH21	521427.612	209146.026	521427.612	209146.026	Required	
SMH22	521407.641	209131.788	521407.641	209131.788	Required	
SMH23	521392.848	209127.614	521392.848	209127.614	Required	
SMH24	521338.473	209089.602	521338.473	209089.602	Required	
SMH25 HB	521365.194	209107.899	521365.194	209107.899	Required	
	521371.241	209097.834			No Entry	

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PIPELINE SCHEDULES for Storm

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	300	SMH1	75.500	74.200	1.000	Open Manhole	1200
2.000	o	300	SMH2	75.450	74.125	1.025	Open Manhole	1200
1.001	o	300	SMH3	75.450	73.965	1.185	Open Manhole	1200
3.000	Q90	-7	ACO 900	75.415	74.465	0.050	Open Manhole	100
1.002	o	300	SMH5	75.400	73.585	1.515	Open Manhole	1200
1.003	o	300	SMH6	75.325	73.430	1.595	Open Manhole	1200
1.004	o	375	SMH7	75.415	73.130	1.910	Open Manhole	1350
4.000	o	375	SMH8	75.040	73.455	1.210	Open Manhole	1350
4.001	o	375	SMH9	74.930	73.120	1.435	Open Manhole	1350
1.005	o	450	SMH10	75.000	72.960	1.590	Open Manhole	1350
1.006	o	450	SMH11	74.945	72.835	1.660	Open Manhole	1350
1.007	o	450	SMH12	74.955	72.755	1.750	Open Manhole	1350
5.000	o	225	SMH13	74.980	73.555	1.200	Open Manhole	1200
5.001	o	225	SMH14	75.035	73.300	1.510	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	24.702	105.1	SMH3	75.450	73.965	1.185	Open Manhole	1200
2.000	15.738	98.4	SMH3	75.450	73.965	1.185	Open Manhole	1200
1.001	49.713	130.8	SMH5	75.400	73.585	1.515	Open Manhole	1200
3.000	74.094	149.7	SMH5	75.400	73.970	0.530	Open Manhole	1200
1.002	20.174	130.2	SMH6	75.325	73.430	1.595	Open Manhole	1200
1.003	17.175	76.3	SMH7	75.415	73.205	1.910	Open Manhole	1350
1.004	29.043	305.7	SMH10	75.000	73.035	1.590	Open Manhole	1350
4.000	31.210	124.8	SMH9	74.930	73.205	1.350	Open Manhole	1350
4.001	22.687	141.8	SMH10	75.000	72.960	1.665	Open Manhole	1350
1.005	15.066	120.5	SMH11	74.945	72.835	1.660	Open Manhole	1350
1.006	9.489	118.6	SMH12	74.955	72.755	1.750	Open Manhole	1350
1.007	16.161	21.3	SMH23	74.890	71.995	2.445	Open Manhole	1500
5.000	23.643	92.7	SMH14	75.035	73.300	1.510	Open Manhole	1200
5.001	26.848	28.6	TANK	74.935	72.362	2.348	Open Manhole	100

PIPELINE SCHEDULES for Storm

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)
5.002	o	600	TANK	74.935	71.987	2.348	Open Manhole	100
5.003	o	600	SMH15	74.935	71.940	2.395	Open Manhole	1500
6.000	o	300	SMH16	75.070	72.220	2.550	Open Manhole	1200
5.004	o	600	SMH17	74.890	71.880	2.410	Open Manhole	1500
7.000	o	300	SMH18	75.400	74.045	1.055	Open Manhole	1200
7.001	o	300	SMH19	75.400	73.935	1.165	Open Manhole	1200
8.000	o	300	SMH20	75.300	73.870	1.130	Open Manhole	1200
7.002	o	375	SMH21	75.120	73.730	1.015	Open Manhole	1350
7.003	o	375	SMH22	74.890	73.315	1.200	Open Manhole	1350
1.008	o	600	SMH23	74.890	71.845	2.445	Open Manhole	1500
9.000	o	225	SMH24	75.000	73.875	0.900	Open Manhole	1200
1.009	o	450	SMH25 HB	75.000	71.770	2.780	Open Manhole	2100

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)
5.002	21.856	437.1	SMH15	74.935	71.937	2.398	Open Manhole	1500
5.003	28.875	481.3	SMH17	74.890	71.880	2.410	Open Manhole	1500
6.000	8.720	218.0	SMH17	74.890	72.180	2.410	Open Manhole	1500
5.004	17.529	500.8	SMH23	74.890	71.845	2.445	Open Manhole	1500
7.000	16.301	148.2	SMH19	75.400	73.935	1.165	Open Manhole	1200
7.001	19.721	151.7	SMH21	75.120	73.805	1.015	Open Manhole	1350
8.000	11.684	179.8	SMH21	75.120	73.805	1.015	Open Manhole	1350
7.002	24.527	59.1	SMH22	74.890	73.315	1.200	Open Manhole	1350
7.003	15.371	12.3	SMH23	74.890	72.070	2.445	Open Manhole	1500
1.008	33.961	452.8	SMH25 HB	75.000	71.770	2.630	Open Manhole	2100
9.000	32.380	99.6	SMH25 HB	75.000	73.550	1.225	Open Manhole	2100
1.009	11.742	33.1		74.520	71.415	2.655	Open Manhole	0

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Setting Out Information - True Coordinates (Storm)

PN	USMH Name	Dia/Len (mm)	Width (mm)	US Easting (m)	US Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Layout (North)
1.000	SMH1	1200		521428.518	209205.935	521428.518	209205.935	
2.000	SMH2	1200		521442.315	209231.933	521442.315	209231.933	
1.001	SMH3	1200		521426.636	209230.566	521426.636	209230.566	
3.000	ACO 900	100		521450.723	209234.665	521450.723	209234.665	
1.002	SMH5	1200		521377.111	209226.248	521377.111	209226.248	
1.003	SMH6	1200		521378.648	209206.133	521378.648	209206.133	
1.004	SMH7	1350		521379.956	209189.008	521379.956	209189.008	
4.000	SMH8	1350		521349.223	209202.633	521349.223	209202.633	
4.001	SMH9	1350		521367.341	209177.220	521367.341	209177.220	
1.005	SMH10	1350		521382.169	209160.050	521382.169	209160.050	
1.006	SMH11	1350		521390.916	209147.783	521390.916	209147.783	
1.007	SMH12	1350		521398.952	209142.576	521398.952	209142.576	
5.000	SMH13	1200		521311.732	209185.620	521311.732	209185.620	
5.001	SMH14	1200		521330.984	209199.345	521330.984	209199.345	
5.002	TANK	100		521350.176	209180.569	521350.176	209180.569	
5.003	SMH15	1500		521365.910	209165.398	521365.910	209165.398	

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Setting Out Information - True Coordinates (Storm)

PN	USMH Name	Dia/Len (mm)	Width (mm)	US Easting (m)	US Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Layout (North)
6.000	SMH16	1200		521375.571	209136.825	521375.571	209136.825	
5.004	SMH17	1500		521382.672	209141.887	521382.672	209141.887	
7.000	SMH18	1200		521458.595	209140.595	521458.595	209140.595	
7.001	SMH19	1200		521443.526	209134.379	521443.526	209134.379	
8.000	SMH20	1200		521435.181	209154.927	521435.181	209154.927	
7.002	SMH21	1350		521427.612	209146.026	521427.612	209146.026	
7.003	SMH22	1350		521407.641	209131.788	521407.641	209131.788	
1.008	SMH23	1500		521392.848	209127.614	521392.848	209127.614	
9.000	SMH24	1200		521338.473	209089.602	521338.473	209089.602	
1.009	SMH25 HB	2100		521365.194	209107.899	521365.194	209107.899	

PN	DSMH Name	Dia/Len (mm)	Width (mm)	DS Easting (m)	DS Northing (m)	Layout (North)
1.009		0		521371.241	209097.834	

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Setting Out Information - Site Coordinates (Storm)


PN	USMH Name	Dia/Len (mm)	Width (mm)	US Easting (m)	US Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Layout (North)
1.000	SMH1	1200		521428.518	209205.935	521428.518	209205.935	
2.000	SMH2	1200		521442.315	209231.933	521442.315	209231.933	
1.001	SMH3	1200		521426.636	209230.566	521426.636	209230.566	
3.000	ACO 900	100		521450.723	209234.665	521450.723	209234.665	
1.002	SMH5	1200		521377.111	209226.248	521377.111	209226.248	
1.003	SMH6	1200		521378.648	209206.133	521378.648	209206.133	
1.004	SMH7	1350		521379.956	209189.008	521379.956	209189.008	
4.000	SMH8	1350		521349.223	209202.633	521349.223	209202.633	
4.001	SMH9	1350		521367.341	209177.220	521367.341	209177.220	
1.005	SMH10	1350		521382.169	209160.050	521382.169	209160.050	
1.006	SMH11	1350		521390.916	209147.783	521390.916	209147.783	
1.007	SMH12	1350		521398.952	209142.576	521398.952	209142.576	
5.000	SMH13	1200		521311.732	209185.620	521311.732	209185.620	
5.001	SMH14	1200		521330.984	209199.345	521330.984	209199.345	
5.002	TANK	100		521350.176	209180.569	521350.176	209180.569	
5.003	SMH15	1500		521365.910	209165.398	521365.910	209165.398	

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Setting Out Information - Site Coordinates (Storm)

PN	USMH Name	Dia/Len (mm)	Width (mm)	US Easting (m)	US Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Layout (North)
6.000	SMH16	1200		521375.571	209136.825	521375.571	209136.825	
5.004	SMH17	1500		521382.672	209141.887	521382.672	209141.887	
7.000	SMH18	1200		521458.595	209140.595	521458.595	209140.595	
7.001	SMH19	1200		521443.526	209134.379	521443.526	209134.379	
8.000	SMH20	1200		521435.181	209154.927	521435.181	209154.927	
7.002	SMH21	1350		521427.612	209146.026	521427.612	209146.026	
7.003	SMH22	1350		521407.641	209131.788	521407.641	209131.788	
1.008	SMH23	1500		521392.848	209127.614	521392.848	209127.614	
9.000	SMH24	1200		521338.473	209089.602	521338.473	209089.602	
1.009	SMH25 HB	2100		521365.194	209107.899	521365.194	209107.899	

PN	DSMH Name	Dia/Len (mm)	Width (mm)	DS Easting (m)	DS Northing (m)	Layout (North)
1.009		0		521371.241	209097.834	

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Network Classifications for Storm

PN	USMH Name	Pipe Dia (mm)	Min Cover Depth (m)	Max Cover Depth (m)	Pipe Type	MH Dia (mm)	MH Width (mm)	MH Ring Depth (m)	MH Type
1.000	SMH1	300	1.000	1.185	Unclassified	1200	0	1.000	Unclassified
2.000	SMH2	300	1.025	1.185	Unclassified	1200	0	1.025	Unclassified
1.001	SMH3	300	1.185	1.515	Unclassified	1200	0	1.185	Unclassified
3.000	ACO 900	-7	0.050	0.530	Unclassified	100	0	0.050	Unclassified
1.002	SMH5	300	1.515	1.595	Unclassified	1200	0	1.515	Unclassified
1.003	SMH6	300	1.595	1.910	Unclassified	1200	0	1.595	Unclassified
1.004	SMH7	375	1.590	1.910	Unclassified	1350	0	1.910	Unclassified
4.000	SMH8	375	1.210	1.350	Unclassified	1350	0	1.210	Unclassified
4.001	SMH9	375	1.435	1.665	Unclassified	1350	0	1.435	Unclassified
1.005	SMH10	450	1.590	1.660	Unclassified	1350	0	1.590	Unclassified
1.006	SMH11	450	1.660	1.750	Unclassified	1350	0	1.660	Unclassified
1.007	SMH12	450	1.750	2.445	Unclassified	1350	0	1.750	Unclassified
5.000	SMH13	225	1.200	1.510	Unclassified	1200	0	1.200	Unclassified
5.001	SMH14	225	1.510	2.348	Unclassified	1200	0	1.510	Unclassified
5.002	TANK	600	2.348	2.398	Unclassified	100	0	2.348	Unclassified
5.003	SMH15	600	2.395	2.410	Unclassified	1500	0	2.395	Unclassified
6.000	SMH16	300	2.410	2.550	Unclassified	1200	0	2.550	Unclassified
5.004	SMH17	600	2.410	2.445	Unclassified	1500	0	2.410	Unclassified
7.000	SMH18	300	1.055	1.165	Unclassified	1200	0	1.055	Unclassified
7.001	SMH19	300	1.015	1.165	Unclassified	1200	0	1.165	Unclassified
8.000	SMH20	300	1.015	1.130	Unclassified	1200	0	1.130	Unclassified
7.002	SMH21	375	1.015	1.200	Unclassified	1350	0	1.015	Unclassified
7.003	SMH22	375	1.200	2.445	Unclassified	1350	0	1.200	Unclassified
1.008	SMH23	600	2.445	2.630	Unclassified	1500	0	2.445	Unclassified
9.000	SMH24	225	0.900	1.225	Unclassified	1200	0	0.900	Unclassified
1.009	SMH25 HB	450	2.655	2.780	Unclassified	2100	0	2.780	Unclassified


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)
1.009		74.520	71.415	71.400	0	0

Simulation Criteria for Storm


Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m ³ /ha Storage	2.000
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	1
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

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Simulation Criteria for Storm

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)	20.000	Storm Duration (mins)	30
Ratio R	0.433		

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Online Controls for Storm

Hydro-Brake® Optimum Manhole: SMH25 HB, DS/PN: 1.009, Volume (m³): 21.5


Unit Reference	MD-SHE-0402-1220-3000-1220
Design Head (m)	3.000
Design Flow (l/s)	122.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	402
Invert Level (m)	71.770
Minimum Outlet Pipe Diameter (mm)	450
Suggested Manhole Diameter (mm)	Site Specific Design (Contact Hydro International)

Control Points Head (m) Flow (l/s)

Design Point (Calculated)	3.000	121.6
Flush-Flo™	0.898	121.3
Kick-Flo®	1.956	98.8
Mean Flow over Head Range	-	104.7

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	11.0	1.200	119.7	3.000	121.6	7.000	183.9
0.200	39.5	1.400	117.4	3.500	131.1	7.500	190.2
0.300	76.4	1.600	113.8	4.000	139.9	8.000	196.3
0.400	109.1	1.800	107.4	4.500	148.2	8.500	202.3
0.500	114.5	2.000	99.9	5.000	156.0	9.000	208.0
0.600	117.9	2.200	104.6	5.500	163.5	9.500	213.6
0.800	121.0	2.400	109.1	6.000	170.6		
1.000	121.1	2.600	113.5	6.500	177.4		


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Storage Structures for Storm

Cellular Storage Manhole: TANK, DS/PN: 5.002

Invert Level (m) 71.987 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	286.5	286.5	1.500	0.0	414.5
1.400	286.5	414.5			

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1 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 Storage Structures 1
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 Ratio R 0.433
Region England and Wales Cv (Summer) 0.750
M5-60 (mm) 20.000 Cv (Winter) 0.840

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, 30

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	SMH1	15 Winter	1	+0%	100/15 Summer				74.244
2.000	SMH2	15 Winter	1	+0%	30/15 Winter				74.169
1.001	SMH3	15 Winter	1	+0%	30/15 Summer				74.062
3.000	ACO 900	15 Winter	1	+0%					74.519
1.002	SMH5	15 Winter	1	+0%	30/15 Summer				73.729
1.003	SMH6	15 Winter	1	+0%	30/15 Summer				73.570
1.004	SMH7	15 Winter	1	+0%	30/15 Summer				73.333
4.000	SMH8	15 Winter	1	+0%	30/15 Summer				73.547
4.001	SMH9	15 Winter	1	+0%	30/15 Summer				73.258
1.005	SMH10	15 Winter	1	+0%	30/15 Summer				73.180
1.006	SMH11	15 Winter	1	+0%	30/15 Summer				73.096
1.007	SMH12	15 Winter	1	+0%	30/15 Summer				72.897
5.000	SMH13	15 Winter	1	+0%	100/30 Winter				73.605
5.001	SMH14	15 Winter	1	+0%	100/30 Winter				73.352
5.002	TANK	30 Winter	1	+0%	30/15 Winter				72.147
5.003	SMH15	15 Winter	1	+0%	30/15 Summer				72.292
6.000	SMH16	15 Winter	1	+0%	30/15 Summer				72.400
5.004	SMH17	15 Winter	1	+0%	30/15 Summer				72.395

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


PN	US/MH Name	Surcharged Flooded		Flow / Overflow Cap. (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
		Depth (m)	Volume (m ³)					
1.000	SMH1	-0.256	0.000	0.05		5.0	OK	
2.000	SMH2	-0.256	0.000	0.05		5.0	OK	
1.001	SMH3	-0.203	0.000	0.22		20.4	OK	
3.000	ACO 900	-0.846	0.000	0.01		10.6	OK	
1.002	SMH5	-0.156	0.000	0.46		39.3	OK	
1.003	SMH6	-0.160	0.000	0.44		47.8	OK	
1.004	SMH7	-0.172	0.000	0.56		56.1	OK	
4.000	SMH8	-0.283	0.000	0.14		21.7	OK	
4.001	SMH9	-0.237	0.000	0.29		41.4	OK	
1.005	SMH10	-0.230	0.000	0.48		96.2	OK	
1.006	SMH11	-0.189	0.000	0.63		107.2	OK	
1.007	SMH12	-0.308	0.000	0.22		106.8	OK	
5.000	SMH13	-0.175	0.000	0.11		5.7	OK	
5.001	SMH14	-0.173	0.000	0.12		10.8	OK	
5.002	TANK	-0.440	0.000	0.08	29	20.0	OK	
5.003	SMH15	-0.248	0.000	0.09		22.8	OK	
6.000	SMH16	-0.120	0.000	0.24		13.5	OK	
5.004	SMH17	-0.085	0.000	0.13		25.2	OK	

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1 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 Level (m)
7.000	SMH18	15	Winter	1	+0%	100/15	Summer		74.130
7.001	SMH19	15	Winter	1	+0%	100/15	Summer		74.029
8.000	SMH20	15	Winter	1	+0%	100/15	Summer		73.973
7.002	SMH21	15	Winter	1	+0%	100/15	Summer		73.834
7.003	SMH22	15	Winter	1	+0%	100/15	Summer		73.401
1.008	SMH23	15	Winter	1	+0%	30/15	Summer		72.445
9.000	SMH24	15	Winter	1	+0%	100/30	Winter		73.921
1.009	SMH25 HB	15	Winter	1	+0%	1/15	Summer		72.352

PN	US/MH Name	Surcharged		Flooded		Half Drain		Pipe Flow (l/s)	Status	Level Exceeded
		Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)	Time (mins)				
7.000	SMH18	-0.215	0.000	0.18			13.9		OK	
7.001	SMH19	-0.206	0.000	0.22			16.9		OK	
8.000	SMH20	-0.197	0.000	0.26			16.4		OK	
7.002	SMH21	-0.271	0.000	0.17			38.5		OK	
7.003	SMH22	-0.289	0.000	0.12			52.3		OK	
1.008	SMH23	0.000	0.000	0.51			137.1		OK	
9.000	SMH24	-0.179	0.000	0.09			4.5		OK	
1.009	SMH25 HB	0.132	0.000	0.35			117.5		SURCHARGED	

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30 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 Storage Structures 1
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 Ratio R 0.433
Region England and Wales Cv (Summer) 0.750
M5-60 (mm) 20.000 Cv (Winter) 0.840

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, 30

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	SMH1	15 Winter	30	+0%	100/15 Summer				74.429
2.000	SMH2	15 Winter	30	+0%	30/15 Winter				74.431
1.001	SMH3	15 Winter	30	+0%	30/15 Summer				74.416
3.000	ACO 900	15 Winter	30	+0%					74.570
1.002	SMH5	15 Summer	30	+0%	30/15 Summer				74.299
1.003	SMH6	15 Winter	30	+0%	30/15 Summer				74.214
1.004	SMH7	15 Winter	30	+0%	30/15 Summer				74.057
4.000	SMH8	15 Summer	30	+0%	30/15 Summer				74.191
4.001	SMH9	15 Winter	30	+0%	30/15 Summer				74.115
1.005	SMH10	15 Summer	30	+0%	30/15 Summer				73.970
1.006	SMH11	15 Winter	30	+0%	30/15 Summer				73.806
1.007	SMH12	30 Winter	30	+0%	30/15 Summer				73.732
5.000	SMH13	15 Winter	30	+0%	100/30 Winter				73.636
5.001	SMH14	15 Winter	30	+0%	100/30 Winter				73.389
5.002	TANK	30 Winter	30	+0%	30/15 Winter				72.792
5.003	SMH15	30 Winter	30	+0%	30/15 Summer				73.042
6.000	SMH16	30 Winter	30	+0%	30/15 Summer				73.395
5.004	SMH17	30 Winter	30	+0%	30/15 Summer				73.352

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


PN	US/MH Name	Surcharged Flooded		Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
		Depth (m)	Volume (m ³)						
1.000	SMH1	-0.071	0.000	0.12			11.9	OK	
2.000	SMH2	0.006	0.000	0.12			11.7	SURCHARGED	
1.001	SMH3	0.151	0.000	0.53			48.5	SURCHARGED	
3.000	ACO 900	-0.795	0.000	0.03			25.8	OK	
1.002	SMH5	0.414	0.000	1.17			98.9	SURCHARGED	
1.003	SMH6	0.484	0.000	1.03			112.0	SURCHARGED	
1.004	SMH7	0.552	0.000	1.19			119.2	SURCHARGED	
4.000	SMH8	0.361	0.000	0.40			63.0	SURCHARGED	
4.001	SMH9	0.620	0.000	0.83			118.5	SURCHARGED	
1.005	SMH10	0.560	0.000	1.11			220.7	SURCHARGED	
1.006	SMH11	0.521	0.000	1.57			265.3	SURCHARGED	
1.007	SMH12	0.527	0.000	0.44			216.2	SURCHARGED	
5.000	SMH13	-0.144	0.000	0.28			13.9	OK	
5.001	SMH14	-0.136	0.000	0.32			29.3	OK	
5.002	TANK	0.205	0.000	0.25		41	64.1	SURCHARGED	
5.003	SMH15	0.502	0.000	0.24			59.9	SURCHARGED	
6.000	SMH16	0.875	0.000	0.72			41.3	SURCHARGED	
5.004	SMH17	0.872	0.000	0.39			73.5	SURCHARGED	

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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 Level (m)
7.000	SMH18	15	Winter	30	+0%	100/15	Summer		74.184
7.001	SMH19	15	Winter	30	+0%	100/15	Summer		74.095
8.000	SMH20	15	Winter	30	+0%	100/15	Summer		74.043
7.002	SMH21	15	Winter	30	+0%	100/15	Summer		73.905
7.003	SMH22	15	Winter	30	+0%	100/15	Summer		73.600
1.008	SMH23	30	Winter	30	+0%	30/15	Summer		73.477
9.000	SMH24	15	Winter	30	+0%	100/30	Winter		73.947
1.009	SMH25	HB	30	Winter	30	+0%	1/15	Summer	73.479

PN	US/MH Name	Surcharged Flooded			Half Drain Pipe		Status	Level Exceeded
		Depth (m)	Volume (m³)	Flow / Overflow Cap. (l/s)	Time (mins)	Flow (l/s)		
7.000	SMH18	-0.161	0.000	0.44		34.1	OK	
7.001	SMH19	-0.140	0.000	0.54		42.6	OK	
8.000	SMH20	-0.127	0.000	0.63		40.2	OK	
7.002	SMH21	-0.200	0.000	0.43		97.7	OK	
7.003	SMH22	-0.090	0.000	0.31		137.3	OK	
1.008	SMH23	1.032	0.000	0.67		179.1	SURCHARGED	
9.000	SMH24	-0.153	0.000	0.23		11.0	OK	
1.009	SMH25	HB	1.259	0.000	0.36	120.6	SURCHARGED	

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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 Storage Structures 1
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 Ratio R 0.433
Region England and Wales Cv (Summer) 0.750
M5-60 (mm) 20.000 Cv (Winter) 0.840

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, 30

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	SMH1	15 Winter	100	+30%	100/15 Summer				75.265
2.000	SMH2	15 Winter	100	+30%	30/15 Winter				75.263
1.001	SMH3	15 Winter	100	+30%	30/15 Summer				75.248
3.000	ACO 900	15 Winter	100	+30%					75.178
1.002	SMH5	15 Winter	100	+30%	30/15 Summer				75.113
1.003	SMH6	15 Winter	100	+30%	30/15 Summer				74.909
1.004	SMH7	15 Winter	100	+30%	30/15 Summer				74.816
4.000	SMH8	15 Winter	100	+30%	30/15 Summer				75.006
4.001	SMH9	15 Winter	100	+30%	30/15 Summer				74.901
1.005	SMH10	15 Winter	100	+30%	30/15 Summer				74.749
1.006	SMH11	60 Winter	100	+30%	30/15 Summer				74.595
1.007	SMH12	60 Winter	100	+30%	30/15 Summer				74.492
5.000	SMH13	60 Winter	100	+30%	100/30 Winter				74.449
5.001	SMH14	60 Winter	100	+30%	100/30 Winter				74.443
5.002	TANK	60 Winter	100	+30%	30/15 Winter				74.430
5.003	SMH15	60 Winter	100	+30%	30/15 Summer				74.426
6.000	SMH16	60 Winter	100	+30%	30/15 Summer				74.425
5.004	SMH17	60 Winter	100	+30%	30/15 Summer				74.421

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

PN	US/MH Name	Surcharged Flooded		Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
		Depth (m)	Volume (m ³)						
1.000	SMH1	0.765	0.000	0.17			16.0	FLOOD RISK	
2.000	SMH2	0.838	0.000	0.17			16.2	FLOOD RISK	
1.001	SMH3	0.983	0.000	0.75			68.7	FLOOD RISK	
3.000	ACO 900	-0.187	0.000	0.05			38.6	FLOOD RISK	
1.002	SMH5	1.228	0.000	1.45			122.8	FLOOD RISK	
1.003	SMH6	1.179	0.000	1.24			135.1	SURCHARGED	
1.004	SMH7	1.311	0.000	1.47			147.4	SURCHARGED	
4.000	SMH8	1.176	0.000	0.58			91.5	FLOOD RISK	
4.001	SMH9	1.406	0.000	1.28			183.9	FLOOD RISK	
1.005	SMH10	1.339	0.000	1.39			277.6	FLOOD RISK	
1.006	SMH11	1.310	0.000	1.40			236.7	SURCHARGED	
1.007	SMH12	1.287	0.000	0.52			254.3	SURCHARGED	
5.000	SMH13	0.669	0.000	0.26			12.8	SURCHARGED	
5.001	SMH14	0.918	0.000	0.29			25.8	SURCHARGED	
5.002	TANK	1.843	0.000	0.27		82	69.2	SURCHARGED	
5.003	SMH15	1.886	0.000	0.37			92.5	SURCHARGED	
6.000	SMH16	1.905	0.000	0.95			54.0	SURCHARGED	
5.004	SMH17	1.941	0.000	0.61			113.4	SURCHARGED	

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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 Level (m)
7.000	SMH18	15 Winter	100	+30%	100/15 Summer				74.828
7.001	SMH19	30 Winter	100	+30%	100/15 Summer				74.712
8.000	SMH20	30 Winter	100	+30%	100/15 Summer				74.709
7.002	SMH21	30 Winter	100	+30%	100/15 Summer				74.624
7.003	SMH22	60 Winter	100	+30%	100/15 Summer				74.429
1.008	SMH23	60 Winter	100	+30%	30/15 Summer				74.416
9.000	SMH24	60 Winter	100	+30%	100/30 Winter				74.396
1.009	SMH25 HB	60 Winter	100	+30%	1/15 Summer				74.390

PN	US/MH Name	Surcharged		Flooded		Half Drain		Pipe		Level Exceeded
		Depth (m)	Volume (m³)	Flow / Cap. (l/s)	Overflow (l/s)	Time (mins)	Flow (l/s)	Status		
7.000	SMH18	0.483	0.000	0.77			59.5	SURCHARGED		
7.001	SMH19	0.477	0.000	1.03			80.5	SURCHARGED		
8.000	SMH20	0.539	0.000	1.11			71.2	SURCHARGED		
7.002	SMH21	0.519	0.000	0.83			187.3	SURCHARGED		
7.003	SMH22	0.739	0.000	0.43			188.7	SURCHARGED		
1.008	SMH23	1.971	0.000	0.77			206.9	SURCHARGED		
9.000	SMH24	0.296	0.000	0.21			10.1	SURCHARGED		
1.009	SMH25 HB	2.170	0.000	0.36			121.1	SURCHARGED		