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18th Fl, Tower C, Cyber Gree... DLF Cyber City, DLF Phase - III Gurgaon, Haryanan - 122 002,...		
Date 12/10/2022 17:10 File COMBINED MODEL_TRAIL-1.MDX	Designed by KARA5291 Checked by	
XP Solutions		Network 2020.1.3

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)	100	PIMP (%)	100
M5-60 (mm)	20.000	Add Flow / Climate Change (%)	0
Ratio R	0.400	Minimum Backdrop Height (m)	0.500
Maximum Rainfall (mm/hr)	250	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.	1.000	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
2.000	12.310	0.082	150.0	0.031	5.00	0.0	0.600	o	225	Pipe/Conduit	
2.001	12.013	0.310	38.8	0.054	0.00	0.0	0.600	o	225	Pipe/Conduit	
3.000	9.235	0.102	90.2	0.032	5.00	0.0	0.600	o	150	Pipe/Conduit	
3.001	7.896	0.035	225.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
2.002	10.886	0.185	59.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
2.003	7.824	0.280	27.9	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
2.004	23.295	0.535	43.5	0.031	0.00	0.0	0.600	o	300	Pipe/Conduit	
4.000	13.524	0.113	120.0	0.025	5.00	0.0	0.600	o	150	Pipe/Conduit	
4.001	11.248	0.174	64.5	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL E (m)	I.Area (ha)	E Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
2.000	161.66	5.19	8.630	0.031	0.0	0.0	0.0	1.07	42.4	18.0
2.001	160.58	5.29	8.548	0.085	0.0	0.0	0.0	2.11	83.8	49.2
3.000	162.21	5.15	8.450	0.032	0.0	0.0	0.0	1.06	18.7	18.7
3.001	160.47	5.30	8.273	0.032	0.0	0.0	0.0	0.87	34.5	18.7
2.002	159.29	5.40	8.238	0.117	0.0	0.0	0.0	1.71	67.8	67.1
2.003	158.71	5.46	8.053	0.117	0.0	0.0	0.0	2.48	98.8	67.1
2.004	156.95	5.62	7.698	0.147	0.0	0.0	0.0	2.39	168.9	83.5
4.000	161.05	5.25	7.600	0.025	0.0	0.0	0.0	0.92	16.2	14.5
4.001	159.37	5.40	7.487	0.025	0.0	0.0	0.0	1.25	22.2	14.5













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
2.005	18.340	0.082	222.8	0.008	0.00	0.0	0.600	o	375	Pipe/Conduit	
5.000	34.249	0.228	150.0	0.014	5.00	0.0	0.600	o	150	Pipe/Conduit	
2.006	12.959	0.058	225.0	0.015	0.00	0.0	0.600	o	375	Pipe/Conduit	
6.000	18.263	0.122	150.0	0.025	5.00	0.0	0.600	o	150	Pipe/Conduit	
6.001	23.241	0.155	149.9	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
7.000	10.976	0.127	86.4	0.018	5.00	0.0	0.600	o	150	Pipe/Conduit	
2.007	20.821	0.059	350.0	0.017	0.00	0.0	0.600	o	450	Pipe/Conduit	
8.000	15.666	0.104	150.0	0.014	5.00	0.0	0.600	o	150	Pipe/Conduit	
8.001	7.947	0.232	34.3	0.002	0.00	0.0	0.600	o	150	Pipe/Conduit	
2.008	20.017	0.057	350.0	0.038	0.00	0.0	0.600	o	450	Pipe/Conduit	
2.009	10.985	0.022	499.3	0.000	0.00	0.0	0.600	o	525	Pipe/Conduit	
9.000	21.529	0.256	84.0	0.049	5.00	0.0	0.600	o	225	Pipe/Conduit	
10.000	14.892	0.066	225.0	0.041	5.00	0.0	0.600	o	225	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)
2.005	154.32	5.87	7.088	0.181	0.0	0.0	0.0	1.21	133.6	100.8
5.000	156.11	5.70	7.459	0.014	0.0	0.0	0.0	0.82	14.5	8.1
2.006	152.51	6.05	7.006	0.210	0.0	0.0	0.0	1.20	133.0	115.9
6.000	159.63	5.37	7.450	0.025	0.0	0.0	0.0	0.82	14.5	14.4
6.001	154.58	5.85	7.328	0.025	0.0	0.0	0.0	0.82	14.5	14.4
7.000	161.93	5.17	7.300	0.018	0.0	0.0	0.0	1.08	19.1	10.3
2.007	149.41	6.37	6.873	0.270	0.0	0.0	0.0	1.08	171.9	145.9
8.000	160.23	5.32	7.450	0.014	0.0	0.0	0.0	0.82	14.5	8.1
8.001	159.37	5.40	7.346	0.016	0.0	0.0	0.0	1.73	30.5	9.4
2.008	146.58	6.68	6.814	0.325	0.0	0.0	0.0	1.08	171.9	171.8
2.009	144.96	6.86	6.681	0.325	0.0	0.0	0.0	1.00	215.5	171.8
9.000	160.99	5.25	7.595	0.049	0.0	0.0	0.0	1.43	56.8	28.8
10.000	160.60	5.29	7.405	0.041	0.0	0.0	0.0	0.87	34.5	23.9

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
9.001	13.360	0.223	60.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit		
11.000	10.793	0.072	150.0	0.008	5.00	0.0	1.500	o	150	Pipe/Conduit		
11.001	6.950	0.066	105.9	0.000	0.00	0.0	1.500	o	150	Pipe/Conduit		
12.000	13.136	0.058	225.0	0.046	5.00	0.0	0.600	o	225	Pipe/Conduit		
12.001	5.582	0.037	150.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit		
12.002	9.285	0.062	149.8	0.037	0.00	0.0	0.600	o	300	Pipe/Conduit		
11.002	37.706	0.198	190.0	0.007	0.00	0.0	1.500	o	300	Pipe/Conduit		
11.003	18.955	0.103	184.4	0.002	0.00	0.0	1.500	o	300	Pipe/Conduit		
9.002	29.292	0.098	300.0	0.021	0.00	0.0	0.600	o	375	Pipe/Conduit		
9.003	19.030	0.076	252.0	0.000	0.00	0.0	1.500	o	375	Pipe/Conduit		
9.004	8.694	0.063	138.0	0.000	0.00	0.0	1.500	o	150	Pipe/Conduit		
9.005	8.694	0.063	139.1	0.000	0.00	0.0	1.500	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)
9.001	159.13	5.42	7.339	0.091	0.0	0.0	0.0	1.69	67.3	52.1
11.000	160.98	5.25	7.630	0.008	0.0	0.0	0.0	0.71	12.6	4.7
11.001	159.46	5.39	7.558	0.008	0.0	0.0	0.0	0.85	15.0	4.7
12.000	160.98	5.25	7.575	0.046	0.0	0.0	0.0	0.87	34.5	26.9
12.001	159.99	5.34	7.517	0.046	0.0	0.0	0.0	1.07	42.4	26.9
12.002	158.66	5.46	7.404	0.083	0.0	0.0	0.0	1.28	90.7	47.6
11.002	152.16	6.09	7.342	0.098	0.0	0.0	0.0	1.00	71.0	54.1
11.003	149.19	6.40	7.144	0.100	0.0	0.0	0.0	1.02	72.1	54.1
9.002	144.95	6.86	6.966	0.212	0.0	0.0	0.0	1.04	115.0	111.2
9.003	142.28	7.18	6.869	0.212	0.0	0.0	0.0	1.01	111.4	111.2
9.004	161.64	5.19	6.793	0.000	1.0	0.0	0.0	0.74	13.2	1.0
9.005	159.44	5.39	6.730	0.000	1.0	0.0	0.0	0.74	13.1	1.0

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)
2.000	o	225	SMH1	9.630	8.630	0.775	Open Manhole	1200
2.001	o	225	SMH2	9.470	8.548	0.697	Open Manhole	1200
3.000	o	150	SMH4	9.300	8.450	0.700	Open Manhole	1200
3.001	o	225	SMH3	9.100	8.273	0.602	Open Manhole	1200
2.002	o	225	SMH5	9.500	8.238	1.037	Open Manhole	1200
2.003	o	225	SMH6	8.880	8.053	0.602	Open Manhole	1200
2.004	o	300	SMH7	8.600	7.698	0.602	Open Manhole	1200
4.000	o	150	SMH17	8.500	7.600	0.750	Open Manhole	1200
4.001	o	150	SIC7	8.500	7.487	0.863	Open Manhole	1200
2.005	o	375	SMH09	8.500	7.088	1.037	Open Manhole	1350
5.000	o	150	SMH18	8.400	7.459	0.791	Open Manhole	1200
2.006	o	375	SMH12	8.500	7.006	1.119	Open Manhole	1350
6.000	o	150	SMH08	8.500	7.450	0.900	Open Manhole	1200
6.001	o	150	SMH13	8.495	7.328	1.017	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)
2.000	12.310	150.0	SMH2	9.470	8.548	0.697	Open Manhole	1200
2.001	12.013	38.8	SMH5	9.500	8.238	1.037	Open Manhole	1200
3.000	9.235	90.2	SMH3	9.100	8.348	0.602	Open Manhole	1200
3.001	7.896	225.0	SMH5	9.500	8.238	1.037	Open Manhole	1200
2.002	10.886	59.0	SMH6	8.880	8.053	0.602	Open Manhole	1200
2.003	7.824	27.9	SMH7	8.600	7.773	0.602	Open Manhole	1200
2.004	23.295	43.5	SMH09	8.500	7.163	1.037	Open Manhole	1350
4.000	13.524	120.0	SIC7	8.500	7.487	0.863	Open Manhole	1200
4.001	11.248	64.5	SMH09	8.500	7.313	1.037	Open Manhole	1350
2.005	18.340	222.8	SMH12	8.500	7.006	1.119	Open Manhole	1350
5.000	34.249	150.0	SMH12	8.500	7.231	1.119	Open Manhole	1350
2.006	12.959	225.0	SMH14	8.490	6.948	1.167	Open Manhole	1350
6.000	18.263	150.0	SMH13	8.495	7.328	1.017	Open Manhole	1200
6.001	23.241	149.9	SMH14	8.490	7.173	1.167	Open Manhole	1350


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)
7.000	o	150	SH22	8.450	7.300	1.000	Open Manhole	1200
2.007	o	450	SMH14	8.490	6.873	1.167	Open Manhole	1350
8.000	o	150	14	8.500	7.450	0.900	Open Manhole	1200
8.001	o	150	SMH10	8.500	7.346	1.004	Open Manhole	1200
2.008	o	450	SCP7	8.300	6.814	1.036	Open Manhole	1350
2.009	o	525	17	8.300	6.681	1.094	Open Manhole	1500
9.000	o	225	A01	8.720	7.595	0.900	Open Manhole	1200
10.000	o	225	SMH15	8.530	7.405	0.900	Open Manhole	1200
9.001	o	225	SMH11	8.400	7.339	0.836	Open Manhole	1200
11.000	o	150	SCP1	8.380	7.630	0.600	Open Manhole	1200
11.001	o	150	SCP2	8.300	7.558	0.592	Open Manhole	1200
12.000	o	225	Dummy-BR	8.400	7.575	0.600	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)
7.000	10.976	86.4	SMH14	8.490	7.173	1.167	Open Manhole	1350
2.007	20.821	350.0	SCP7	8.300	6.814	1.036	Open Manhole	1350
8.000	15.666	150.0	SMH10	8.500	7.346	1.004	Open Manhole	1200
8.001	7.947	34.3	SCP7	8.300	7.114	1.036	Open Manhole	1350
2.008	20.017	350.0	17	8.300	6.756	1.094	Open Manhole	1500
2.009	10.985	499.3	18	8.300	6.659	1.116	Open Manhole	1500
9.000	21.529	84.0	SMH11	8.400	7.339	0.836	Open Manhole	1200
10.000	14.892	225.0	SMH11	8.400	7.339	0.836	Open Manhole	1200
9.001	13.360	60.0	SCP5	8.475	7.116	1.134	Open Manhole	1500
11.000	10.793	150.0	SCP2	8.300	7.558	0.592	Open Manhole	1200
11.001	6.950	105.9	SCP3	8.360	7.492	0.718	Open Manhole	1500
12.000	13.136	225.0	DUMMY	8.400	7.517	0.658	Open Manhole	1200

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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)
12.001	o	225	DUMMY	8.400	7.517	0.658	Open Manhole	1200
12.002	o	300	FC2	8.300	7.404	0.596	Open Manhole	1200
11.002	o	300	SCP3	8.360	7.342	0.718	Open Manhole	1500
11.003	o	300	SCP4	8.410	7.144	0.966	Open Manhole	1500
9.002	o	375	SCP5	8.475	6.966	1.134	Open Manhole	1500
9.003	o	375	SCP6	8.580	6.869	1.336	Open Manhole	1350
9.004	o	150	HW1	7.900	6.793	0.957	Open Manhole	1350
9.005	o	150	HW2	7.600	6.730	0.720	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)
12.001	5.582	150.0	FC2	8.300	7.479	0.596	Open Manhole	1200
12.002	9.285	149.8	SCP3	8.360	7.342	0.718	Open Manhole	1500
11.002	37.706	190.0	SCP4	8.410	7.144	0.966	Open Manhole	1500
11.003	18.955	184.4	SCP5	8.475	7.041	1.134	Open Manhole	1500
9.002	29.292	300.0	SCP6	8.580	6.869	1.336	Open Manhole	1350
9.003	19.030	252.0	HW1	7.900	6.793	0.732	Open Manhole	1350
9.004	8.694	138.0	HW2	7.600	6.730	0.720	Open Manhole	1200
9.005	8.694	139.1	HW3	7.300	6.667	0.483	Open Manhole	1350

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Online Controls for Storm

Orifice Manhole: 17, DS/PN: 2.009, Volume (m³): 5.8

Diameter (m) 0.001 Discharge Coefficient 0.600 Invert Level (m) 6.756

Hydro-Brake® Optimum Manhole: DUMMY, DS/PN: 12.001, Volume (m³): 1.5

Unit Reference	MD-SHE-0077-2600-1000-2600
Design Head (m)	1.000
Design Flow (l/s)	2.6
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	77
Invert Level (m)	7.517
Minimum Outlet Pipe Diameter (mm)	100
Suggested Manhole Diameter (mm)	1200


Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.000	2.6
Flush-Flo™	0.300	2.6
Kick-Flo®	0.622	2.1
Mean Flow over Head Range	-	2.3

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	2.2	1.200	2.8	3.000	4.3	7.000	6.4
0.200	2.5	1.400	3.0	3.500	4.6	7.500	6.6
0.300	2.6	1.600	3.2	4.000	4.9	8.000	6.8
0.400	2.6	1.800	3.4	4.500	5.2	8.500	7.0
0.500	2.5	2.000	3.6	5.000	5.5	9.000	7.2
0.600	2.2	2.200	3.7	5.500	5.7	9.500	7.4
0.800	2.3	2.400	3.9	6.000	6.0		
1.000	2.6	2.600	4.0	6.500	6.2		

Hydro-Brake® Optimum Manhole: HW1, DS/PN: 9.004, Volume (m³): 3.5

Unit Reference	MD-SHE-0044-9000-1000-9000
Design Head (m)	1.000
Design Flow (l/s)	0.9
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	44

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Hydro-Brake® Optimum Manhole: HW1, DS/PN: 9.004, Volume (m³): 3.5

Invert Level (m) 6.793
Minimum Outlet Pipe Diameter (mm) 75
Suggested Manhole Diameter (mm) 1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.000	0.9
Flush-Flo™	0.194	0.7
Kick-Flo®	0.394	0.6
Mean Flow over Head Range	-	0.7

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	0.7	1.200	1.0	3.000	1.5	7.000	2.2
0.200	0.7	1.400	1.0	3.500	1.6	7.500	2.2
0.300	0.7	1.600	1.1	4.000	1.7	8.000	2.3
0.400	0.6	1.800	1.2	4.500	1.8	8.500	2.4
0.500	0.7	2.000	1.2	5.000	1.9	9.000	2.4
0.600	0.7	2.200	1.3	5.500	1.9	9.500	2.5
0.800	0.8	2.400	1.3	6.000	2.0		
1.000	0.9	2.600	1.4	6.500	2.1		

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Storage Structures for Storm

Cellular Storage Manhole: 17, DS/PN: 2.009

Invert Level (m) 6.800 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 7.16400

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	85.0	85.0	0.901	0.0	118.2
0.900	85.0	118.2			

Porous Car Park Manhole: A01, DS/PN: 9.000

Infiltration Coefficient Base (m/hr) 0.00000 Width (m) 14.0
Membrane Percolation (mm/hr) 4700 Length (m) 24.0
Max Percolation (l/s) 438.7 Slope (1:X) 500.0
Safety Factor 2.0 Depression Storage (mm) 5
Porosity 0.30 Evaporation (mm/day) 3
Invert Level (m) 8.370 Membrane Depth (mm) 350

Porous Car Park Manhole: SMH15, DS/PN: 10.000

Infiltration Coefficient Base (m/hr) 0.00000 Width (m) 15.0
Membrane Percolation (mm/hr) 4700 Length (m) 17.0
Max Percolation (l/s) 332.9 Slope (1:X) 500.0
Safety Factor 2.0 Depression Storage (mm) 5
Porosity 0.30 Evaporation (mm/day) 3
Invert Level (m) 8.180 Membrane Depth (mm) 350


Bio-Retention Area Manhole: Dummy-BR, DS/PN: 12.000

Invert Level (m) 7.575 Infiltration Coefficient Side (m/hr) 0.00000
Porosity 0.30 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000

Depth (m)	Area (m ²)	Perimeter (m)	Depth (m)	Area (m ²)	Perimeter (m)
0.000	36.0	36.000	0.826	108.0	47.000
0.825	107.9	47.000			

Porous Car Park Manhole: FC2, DS/PN: 12.002


Infiltration Coefficient Base (m/hr) 0.00000 Width (m) 30.0
Membrane Percolation (mm/hr) 4700 Length (m) 10.4
Max Percolation (l/s) 407.3 Slope (1:X) 500.0
Safety Factor 2.0 Depression Storage (mm) 5
Porosity 0.30 Evaporation (mm/day) 3
Invert Level (m) 7.950 Membrane Depth (mm) 350

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Tank or Pond Manhole: HW1, DS/PN: 9.004

Invert Level (m) 6.793

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	56.0	1.107	235.1

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2 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 6
Number of Online Controls 3 Number of Time/Area Diagrams 0
Number of Offline Controls 0 Number of Real Time Controls 0


Synthetic Rainfall Details

Rainfall Model FEH
FEH Rainfall Version 2013
Site Location GB 516397 172304 TQ 16397 72304
Data Type Point
Cv (Summer) 0.750
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, 180, 240, 360, 480, 600,
720, 960, 1440, 2160, 2880, 4320, 5760,
7200, 8640, 10080
Return Period(s) (years) 2, 30, 100
Climate Change (%) 0, 0, 40

PN	US/MH Name	Event	Water Surcharged Flooded						
			US/CL (m)	Level (m)	Depth (m)	Volume (m ³)	Flow / Cap.	Overflow (l/s)	
2.000	SMH1	15 minute 2 year Winter I+0%	9.630	8.685	-0.170	0.000	0.13		
2.001	SMH2	15 minute 2 year Winter I+0%	9.470	8.610	-0.163	0.000	0.17		
3.000	SMH4	15 minute 2 year Winter I+0%	9.300	8.507	-0.093	0.000	0.30		
3.001	SMH3	15 minute 2 year Winter I+0%	9.100	8.342	-0.155	0.000	0.18		
2.002	SMH5	15 minute 2 year Winter I+0%	9.500	8.322	-0.140	0.000	0.30		
2.003	SMH6	15 minute 2 year Winter I+0%	8.880	8.126	-0.152	0.000	0.23		
2.004	SMH7	15 minute 2 year Winter I+0%	8.600	7.773	-0.225	0.000	0.14		
4.000	SMH17	15 minute 2 year Winter I+0%	8.500	7.653	-0.097	0.000	0.27		
4.001	SIC7	15 minute 2 year Winter I+0%	8.500	7.533	-0.104	0.000	0.20		
2.005	SMH09	15 minute 2 year Winter I+0%	8.500	7.211	-0.252	0.000	0.24		
5.000	SMH18	15 minute 2 year Winter I+0%	8.400	7.500	-0.109	0.000	0.16		
2.006	SMH12	15 minute 2 year Winter I+0%	8.500	7.144	-0.236	0.000	0.29		
6.000	SMH08	15 minute 2 year Winter I+0%	8.500	7.506	-0.094	0.000	0.29		
6.001	SMH13	15 minute 2 year Winter I+0%	8.495	7.383	-0.096	0.000	0.28		
7.000	SH22	15 minute 2 year Winter I+0%	8.450	7.341	-0.109	0.000	0.16		
2.007	SMH14	120 minute 2 year Winter I+0%	8.490	7.066	-0.257	0.000	0.11		

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

PN	US/MH Name	Pipe	Status
		Flow (l/s)	
2.000	SMH1	4.8	OK
2.001	SMH2	12.0	OK
3.000	SMH4	5.0	OK
3.001	SMH3	5.0	OK
2.002	SMH5	17.2	OK
2.003	SMH6	17.2	OK
2.004	SMH7	21.3	OK
4.000	SMH17	3.9	OK
4.001	SIC7	3.9	OK
2.005	SMH09	26.1	OK
5.000	SMH18	2.3	OK
2.006	SMH12	30.2	OK
6.000	SMH08	3.9	OK
6.001	SMH13	3.9	OK
7.000	SH22	2.8	OK
2.007	SMH14	15.1	OK

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

PN	US/MH Name	Event	Water Surcharged Flooded				
			US/CL (m)	Level (m)	Depth (m)	Volume (m ³)	Flow / Cap.
8.000	14	15 minute 2 year Winter I+0%	8.500	7.491	-0.109	0.000	0.16
8.001	SMH10	15 minute 2 year Winter I+0%	8.500	7.377	-0.119	0.000	0.10
2.008	SCP7	120 minute 2 year Winter I+0%	8.300	7.062	-0.201	0.000	0.12
2.009	17	120 minute 2 year Winter I+0%	8.300	7.059	-0.148	0.000	0.00
9.000	A01	15 minute 2 year Winter I+0%	8.720	7.653	-0.167	0.000	0.14
10.000	SMH15	15 minute 2 year Winter I+0%	8.530	7.476	-0.154	0.000	0.21
9.001	SMH11	15 minute 2 year Winter I+0%	8.400	7.412	-0.152	0.000	0.22
11.000	SCP1	15 minute 2 year Winter I+0%	8.380	7.663	-0.117	0.000	0.11
11.001	SCP2	15 minute 2 year Winter I+0%	8.300	7.589	-0.119	0.000	0.10
12.000	Dummy-BR	15 minute 2 year Winter I+0%	8.400	7.690	-0.110	0.000	0.12
12.001	DUMMY	15 minute 2 year Winter I+0%	8.400	7.685	-0.056	0.000	0.08
12.002	FC2	15 minute 2 year Winter I+0%	8.300	7.471	-0.234	0.000	0.10
11.002	SCP3	15 minute 2 year Winter I+0%	8.360	7.414	-0.228	0.000	0.12
11.003	SCP4	15 minute 2 year Winter I+0%	8.410	7.214	-0.229	0.000	0.12
9.002	SCP5	480 minute 2 year Winter I+0%	8.475	7.190	-0.152	0.000	0.05
9.003	SCP6	480 minute 2 year Winter I+0%	8.580	7.190	-0.054	0.000	0.05
9.004	HW1	480 minute 2 year Winter I+0%	7.900	7.190	0.247	0.000	0.06
9.005	HW2	2880 minute 2 year Winter I+0%	7.600	6.754	-0.126	0.000	0.06

PN	US/MH Name	Overflow (l/s)	Pipe	Status
			Flow (l/s)	
8.000	14	2.2	OK	
8.001	SMH10	2.5	OK	
2.008	SCP7	17.2	OK	
2.009	17	0.0	OK	
9.000	A01	7.5	OK	
10.000	SMH15	6.3	OK	
9.001	SMH11	13.1	OK	
11.000	SCP1	1.3	OK	
11.001	SCP2	1.3	OK	
12.000	Dummy-BR	3.7	OK	
12.001	DUMMY	2.5	OK	
12.002	FC2	6.5	OK	
11.002	SCP3	7.9	OK	
11.003	SCP4	8.0	OK	
9.002	SCP5	4.8	OK	
9.003	SCP6	4.4	OK	
9.004	HW1	0.7	SURCHARGED	
9.005	HW2	0.7	OK	

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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 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 Storage Structures 6
Number of Online Controls 3 Number of Time/Area Diagrams 0
Number of Offline Controls 0 Number of Real Time Controls 0


Synthetic Rainfall Details

Rainfall Model FEH
FEH Rainfall Version 2013
Site Location GB 516397 172304 TQ 16397 72304
Data Type Point
Cv (Summer) 0.750
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, 180, 240, 360, 480, 600,
720, 960, 1440, 2160, 2880, 4320, 5760,
7200, 8640, 10080
Return Period(s) (years) 2, 30, 100
Climate Change (%) 0, 0, 40

PN	US/MH Name	Event	Water Surcharged Flooded						
			US/CL (m)	Level (m)	Depth (m)	Volume (m ³)	Flow / Cap.	Overflow (l/s)	
2.000	SMH1	15 minute 30 year Winter I+0%	9.630	8.718	-0.137	0.000	0.32		
2.001	SMH2	15 minute 30 year Winter I+0%	9.470	8.657	-0.116	0.000	0.47		
3.000	SMH4	15 minute 30 year Winter I+0%	9.300	8.547	-0.053	0.000	0.73		
3.001	SMH3	15 minute 30 year Winter I+0%	9.100	8.405	-0.092	0.000	0.44		
2.002	SMH5	15 minute 30 year Winter I+0%	9.500	8.392	-0.071	0.000	0.79		
2.003	SMH6	15 minute 30 year Winter I+0%	8.880	8.181	-0.097	0.000	0.61		
2.004	SMH7	15 minute 30 year Winter I+0%	8.600	7.828	-0.170	0.000	0.38		
4.000	SMH17	15 minute 30 year Winter I+0%	8.500	7.689	-0.061	0.000	0.64		
4.001	SIC7	15 minute 30 year Winter I+0%	8.500	7.561	-0.076	0.000	0.48		
2.005	SMH09	60 minute 30 year Winter I+0%	8.500	7.377	-0.086	0.000	0.31		
5.000	SMH18	15 minute 30 year Winter I+0%	8.400	7.525	-0.084	0.000	0.39		
2.006	SMH12	60 minute 30 year Winter I+0%	8.500	7.369	-0.012	0.000	0.36		
6.000	SMH08	15 minute 30 year Winter I+0%	8.500	7.544	-0.056	0.000	0.69		
6.001	SMH13	15 minute 30 year Winter I+0%	8.495	7.420	-0.058	0.000	0.69		
7.000	SH22	60 minute 30 year Winter I+0%	8.450	7.367	-0.083	0.000	0.19		
2.007	SMH14	60 minute 30 year Winter I+0%	8.490	7.363	0.040	0.000	0.33		

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

PN	Name	Pipe		Status
		US/MH	Flow (l/s)	
2.000	SMH1	11.7	OK	
2.001	SMH2	33.7	OK	
3.000	SMH4	12.1	OK	
3.001	SMH3	12.3	OK	
2.002	SMH5	45.0	OK	
2.003	SMH6	45.5	OK	
2.004	SMH7	56.8	OK	
4.000	SMH17	9.5	OK	
4.001	SIC7	9.5	OK	
2.005	SMH09	34.0	OK	
5.000	SMH18	5.4	OK	
2.006	SMH12	37.2	OK	
6.000	SMH08	9.4	OK	
6.001	SMH13	9.5	OK	
7.000	SH22	3.3	OK	
2.007	SMH14	45.8	SURCHARGED	

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

PN	US/MH Name	Event	US/CL (m)	Water Surcharged Flooded			Flow / Cap.
				Level (m)	Depth (m)	Volume (m ³)	
8.000	14	15 minute 30 year Winter I+0%	8.500	7.516	-0.084	0.000	0.39
8.001	SMH10	15 minute 30 year Winter I+0%	8.500	7.395	-0.100	0.000	0.23
2.008	SCP7	60 minute 30 year Winter I+0%	8.300	7.356	0.093	0.000	0.37
2.009	17	60 minute 30 year Winter I+0%	8.300	7.348	0.142	0.000	0.00
9.000	A01	15 minute 30 year Winter I+0%	8.720	7.690	-0.130	0.000	0.36
10.000	SMH15	15 minute 30 year Winter I+0%	8.530	7.521	-0.109	0.000	0.51
9.001	SMH11	480 minute 30 year Winter I+0%	8.400	7.498	-0.066	0.000	0.07
11.000	SCP1	15 minute 30 year Winter I+0%	8.380	7.683	-0.097	0.000	0.27
11.001	SCP2	15 minute 30 year Winter I+0%	8.300	7.607	-0.101	0.000	0.23
12.000	Dummy-BR	30 minute 30 year Winter I+0%	8.400	7.937	0.137	0.000	0.14
12.001	DUMMY	120 minute 30 year Summer I+0%	8.400	7.982	0.241	0.000	0.09
12.002	FC2	15 minute 30 year Winter I+0%	8.300	7.513	-0.192	0.000	0.28
11.002	SCP3	480 minute 30 year Winter I+0%	8.360	7.498	-0.145	0.000	0.06
11.003	SCP4	480 minute 30 year Winter I+0%	8.410	7.498	0.054	0.000	0.07
9.002	SCP5	480 minute 30 year Winter I+0%	8.475	7.497	0.156	0.000	0.08
9.003	SCP6	480 minute 30 year Winter I+0%	8.580	7.496	0.253	0.000	0.08
9.004	HW1	480 minute 30 year Winter I+0%	7.900	7.496	0.553	0.000	0.06
9.005	HW2	480 minute 30 year Winter I+0%	7.600	6.755	-0.125	0.000	0.06

PN	US/MH Name	Overflow (l/s)	Pipe	Status
			Flow (l/s)	
8.000	14	5.3	OK	
8.001	SMH10	6.2	OK	
2.008	SCP7	51.5	SURCHARGED	
2.009	17	0.0	SURCHARGED	
9.000	A01	18.7	OK	
10.000	SMH15	15.5	OK	
9.001	SMH11	4.0	OK	
11.000	SCP1	3.1	OK	
11.001	SCP2	3.1	OK	
12.000	Dummy-BR	4.1	SURCHARGED	
12.001	DUMMY	2.6	SURCHARGED	
12.002	FC2	17.6	OK	
11.002	SCP3	4.3	OK	
11.003	SCP4	4.2	SURCHARGED	
9.002	SCP5	8.6	SURCHARGED	
9.003	SCP6	8.0	SURCHARGED	
9.004	HW1	0.8	SURCHARGED	
9.005	HW2	0.8	OK	

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 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 Storage Structures 6
Number of Online Controls 3 Number of Time/Area Diagrams 0
Number of Offline Controls 0 Number of Real Time Controls 0


Synthetic Rainfall Details

Rainfall Model FEH
FEH Rainfall Version 2013
Site Location GB 516397 172304 TQ 16397 72304
Data Type Point
Cv (Summer) 0.750
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, 180, 240, 360, 480, 600,
720, 960, 1440, 2160, 2880, 4320, 5760,
7200, 8640, 10080
Return Period(s) (years) 2, 30, 100
Climate Change (%) 0, 0, 40

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap.
2.000	SMH1	15 minute 100 year Winter I+40%	9.630	8.823	-0.032	0.000	0.57
2.001	SMH2	15 minute 100 year Winter I+40%	9.470	8.791	0.018	0.000	0.79
3.000	SMH4	15 minute 100 year Winter I+40%	9.300	8.788	0.188	0.000	1.26
3.001	SMH3	15 minute 100 year Winter I+40%	9.100	8.621	0.123	0.000	0.79
2.002	SMH5	15 minute 100 year Winter I+40%	9.500	8.598	0.135	0.000	1.33
2.003	SMH6	60 minute 100 year Winter I+40%	8.880	8.338	0.060	0.000	0.55
2.004	SMH7	60 minute 100 year Winter I+40%	8.600	8.326	0.328	0.000	0.35
4.000	SMH17	60 minute 100 year Winter I+40%	8.500	8.331	0.581	0.000	0.59
4.001	SIC7	60 minute 100 year Winter I+40%	8.500	8.319	0.682	0.000	0.43
2.005	SMH09	60 minute 100 year Winter I+40%	8.500	8.311	0.848	0.000	0.52
5.000	SMH18	60 minute 100 year Winter I+40%	8.400	8.314	0.705	0.000	0.35
2.006	SMH12	60 minute 100 year Winter I+40%	8.500	8.303	0.922	0.000	0.63
6.000	SMH08	60 minute 100 year Winter I+40%	8.500	8.318	0.718	0.000	0.64
6.001	SMH13	60 minute 100 year Winter I+40%	8.495	8.303	0.825	0.000	0.56
7.000	SH22	60 minute 100 year Winter I+40%	8.450	8.304	0.854	0.000	0.32
2.007	SMH14	60 minute 100 year Winter I+40%	8.490	8.296	0.973	0.000	0.57

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

PN	US/MH Name	Overflow (l/s)	Pipe Flow (l/s)	Status
2.000	SMH1		20.7	OK
2.001	SMH2		56.3	SURCHARGED
3.000	SMH4		20.8	SURCHARGED
3.001	SMH3		21.8	SURCHARGED
2.002	SMH5		76.1	SURCHARGED
2.003	SMH6		40.9	SURCHARGED
2.004	SMH7		51.7	FLOOD RISK
4.000	SMH17		8.7	FLOOD RISK
4.001	SIC7		8.5	FLOOD RISK
2.005	SMH09		57.7	FLOOD RISK
5.000	SMH18		4.9	FLOOD RISK
2.006	SMH12		64.8	FLOOD RISK
6.000	SMH08		8.6	FLOOD RISK
6.001	SMH13		7.7	FLOOD RISK
7.000	SH22		5.5	FLOOD RISK
2.007	SMH14		80.2	FLOOD RISK

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

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap.
8.000	14	60 minute 100 year Winter I+40%	8.500	8.295	0.695	0.000	0.36
8.001	SMH10	60 minute 100 year Winter I+40%	8.500	8.286	0.791	0.000	0.20
2.008	SCP7	60 minute 100 year Winter I+40%	8.300	8.290	1.026	0.000	0.68
2.009	17	60 minute 100 year Winter I+40%	8.300	8.279	1.072	0.000	0.00
9.000	A01	1440 minute 100 year Winter I+40%	8.720	7.891	0.071	0.000	0.03
10.000	SMH15	1440 minute 100 year Winter I+40%	8.530	7.891	0.261	0.000	0.04
9.001	SMH11	1440 minute 100 year Winter I+40%	8.400	7.891	0.327	0.000	0.04
11.000	SCP1	1440 minute 100 year Winter I+40%	8.380	7.894	0.114	0.000	0.02
11.001	SCP2	1440 minute 100 year Winter I+40%	8.300	7.894	0.186	0.000	0.02
12.000	Dummy-BR	120 minute 100 year Winter I+40%	8.400	8.347	0.547	0.000	0.17
12.001	DUMMY	480 minute 100 year Summer I+40%	8.400	8.397	0.656	0.000	0.09
12.002	FC2	1440 minute 100 year Winter I+40%	8.300	7.895	0.190	0.000	0.04
11.002	SCP3	1440 minute 100 year Winter I+40%	8.360	7.895	0.252	0.000	0.04
11.003	SCP4	1440 minute 100 year Winter I+40%	8.410	7.891	0.447	0.000	0.04
9.002	SCP5	1440 minute 100 year Winter I+40%	8.475	7.890	0.549	0.000	0.06
9.003	SCP6	1440 minute 100 year Winter I+40%	8.580	7.890	0.647	0.000	0.06
9.004	HW1	1440 minute 100 year Winter I+40%	7.900	7.890	0.947	0.000	0.08
9.005	HW2	720 minute 100 year Winter I+40%	7.600	6.757	-0.123	0.000	0.08

PN	US/MH Name	Pipe Overflow (l/s)	Flow (l/s)	Status
8.000	14		4.9	FLOOD RISK
8.001	SMH10		5.3	FLOOD RISK
2.008	SCP7		94.5	FLOOD RISK
2.009	17		0.0	FLOOD RISK
9.000	A01		1.5	SURCHARGED
10.000	SMH15		1.2	SURCHARGED
9.001	SMH11		2.6	SURCHARGED
11.000	SCP1		0.3	SURCHARGED
11.001	SCP2		0.3	SURCHARGED
12.000	Dummy-BR		5.0	FLOOD RISK
12.001	DUMMY		2.6	FLOOD RISK
12.002	FC2		2.5	SURCHARGED
11.002	SCP3		2.8	SURCHARGED
11.003	SCP4		2.6	SURCHARGED
9.002	SCP5		5.7	SURCHARGED
9.003	SCP6		5.7	SURCHARGED
9.004	HW1		0.9	FLOOD RISK
9.005	HW2		0.9	OK